Martin Gardner Centennial | Randi's Amazing Escape | Futurology | Flying Saucers | *Magic in the Moonlight*

Skeptical Inquirer

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DEFENDING SCIENCE-BASED MEDICINE

44 DOCTOR-BASHING ARGUMENTS ...and Their Rebuttals

Popular Global Warming Factoids

Video Game Violence & Pseudoscience

Evaluating eHarmony's Evidence

Dr. Phil and the Hummingbird

Remembrance of Apocalypse Past

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[FROM THE EDITOR

44 Doctor-Bashing Arguments . . . and Harriet Hall's Rebuttals

You've heard the arguments: *"Doctors only treat symptoms, not the underlying cause of disease." "You are just supporting the party line of mainstream medicine." "Doctors don't do prevention." "Alternative medicine is better because it's holistic." "It's natural, therefore it's safe." "We have plenty of testimonials."*

Enthusiasts for so-called alternative medicine are fond of hurling these and other doctor-bashing arguments back at physicians and others who have the temerity to question their untested alternative remedies and fads. All physicians, especially those who publicly defend science-based medicine, have found themselves on the receiving end of such insults to themselves and their science. Many physicians don't have the will or specific knowledge to respond effectively.

Not Harriet Hall, MD. In our cover article, "44 Doctor-Bashing Arguments . . . and Their Rebuttals," Hall compiles the most often-heard rationalizations for alternative medicine and answers them in her own pithy way. I think this may be the most comprehensive list ever done on the topic—and her rebuttals the most direct, to the point, and readable. Some of the arguments are directed not just at medical science but at science in general: *"Science keeps changing its mind." "Science is dogmatic." "Science doesn't know everything." "There are other ways of knowing."* She answers those too.

Harriet Hall is very familiar to SI readers. Since retiring as an Air Force flight surgeon and family physician she has taken up arms responding to medical-related pseudoscience and misinformation about scientific medicine. She does it with calm confidence and flair. By our count this is her sixteenth Skeptical Inquirer feature article. The first was in 2003. She wrote about homeopathy and faith healing in our two previous issues.

Retired CERN senior physicist John Eades returns to our pages with "Some Popular Global Warming Factoids." He gives brief responses to ten arguments opponents of climate science make with great authority that have no empirical backing. Eades could easily have added ten more, but you get the point.

One point he doesn't address is the current "hiatus" in global warming. Contrarians make much of it, but the science tells us that the excess heat is, for the time being, going into the deep oceans. New papers in the August 22 *Science* and the August 3 *Nature Climate Change* report ocean temperature data showing that deep layers of the Atlantic and Southern Oceans are rapidly warming, temporarily storing vast amounts of excess heat. On September 9, the World Meteorological Organization—announcing that greenhouse gas levels in the atmosphere reached a record high in 2013 (and rose last year at the highest rate in thirty years)—said essentially the same thing. But the *Science* authors expect the process that is causing the enhanced ocean heat sink will inevitably "flip sign," and then "another episode of accelerated global warming should ensue."

Martin Gardner would have been one hundred years old in October. We join in a national celebration of the centennial of this great skeptic's birth by reprinting some of his seminal SI columns, starting in this issue with his first, "Lessons of a Landmark PK Hoax."

Enjoy Martin's clear thinking.

—Kendrick Frazier

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Burzynski Update: Publications, Clinical Trials, and More Charges

Robert Blaskiewicz

Earlier this year Skeptical Inquirer devoted two full-length articles to the case of Stanislaw Burzynski, who has treated cancer patients for decades with an unproven chemotherapy he calls "antineoplastons," under the auspices of FDA clinical trials (SI, March/April 2014). The efforts of skeptics and alarmed medical professionals culminated in an exposé of Burzynski on the front page of *USA Today* in November 2013. The Burzynski Clinic was then on the receiving end of a rapid series of censures and legal actions, including an FDA warning letter and new charges that Burzynski had engaged in false advertising.

At the beginning of the year, Burzynski's supporters established a new group, the ANP Coalition, to promote Burzynski's cause. Using the tactics (and same lobbyist) that got Burzynski's still-unpublished clinical trials opened in the 1990s, the ANP Coalition lobbied their representatives in Washington to pressure the FDA into releasing the clinical hold on behalf of eight brain tumor patients. In late March, the FDA caved and announced that the partial clinical hold on the clinic's antineoplaston trials would be lifted to allow patients to receive the drug under what is known as compassionate access. The FDA stipulated that the treatments had to be administered by a physician other than Burzynski and that the single patient protocols had to be approved by an outside institutional review board. According to the clinic's lawyer, Richard Jaffe, the antineoplastons would be provided for free.

On April 15, the ANP Coalition announced that Burzynski was publishing "The Response and Survival of Children with Recurrent Diffuse Intrinsic Pontine Glioma Based on Phase II Study of Antineoplastons A10 and AS2-1 in Patients with Brainstem Glioma" in the journal *Child's Nervous System*, which presented a subset of patients of a larger clinical trial. When skeptics asked the editor about this, he reported, "I have invited eminent neuro-oncologists to write a comment to be added to the articles. Unfortunately the reviewers of the journal failed to provide their promised evaluation so that after several months there were 'no negative comments' to justify rejection."

The efforts of skeptics and alarmed medical professionals culminated in an exposé of Burzynski on the front page of *USA Today* in November 2013.

On June 6, the ANP Coalition announced that another Burzynski paper, "A Phase II Study of Antineoplastons A10 and AS2-1 in Children with High Grade Glioma. Final Report (Protocol BT-06), and Review of Recent Trials," had been accepted for publication in the *Journal of Cancer Therapy*. The publisher of this journal is flagged on Beall's List of "Potential, possible, or probable predatory scholarly open-access publishers," and the paper, which is deeply flawed, cannot be considered a quality peer-reviewed publication.

In late June, the FDA announced that it would allow the antineoplaston studies to continue, saying that Burzynski had addressed "common and serious (and in some cases fatal) adverse drug reactions, as well as accurate information on how often tumors shrink after treatment with antineoplastons." (In the spring of 2013, the FDA had observed that two-thirds of his reported outcomes were inflated and that there had been more than a hundred overdoses on the treatment with no evidence that the principal investigator had altered the protocol to prevent further adverse events.) Furthermore, on June 23 the clinic announced that phase III trials were in the pipeline.

On the same day that the phase III trials were announced, Terry Bennett, a New Hampshire physician who had agreed to sponsor a special exemption for a young cancer patient, McKenzie Lowe, and to treat her for free (assuming Burzynski was doing the same), reported to a regional newspaper that the Burzynski Clinic approached him for money to pay for McKenzie's treatment. In Bennett's words: "I'm supposed to be the bag man for all of this. They want me to collect the 30 grand for the family and send it to Burzynski." He also opined, "It meets all the criteria for a bait and switch operation."

In response, Ronald A. Lindsay and Michael De Dora of the Center for Inquiry wrote a letter to the FDA expressing dismay at the FDA's actions: "Even under the prior restrictions placed upon Dr. Burzynski by the FDA—by which only other, independent physicians were able to treat new patients using Dr. Burzynski's experimental antineoplastons—patients have reported suffering the unethical profiteering that constitutes the BRI business model."

In mid-July, the Texas Medical Board (TMB) released 202 pages of expanded charges against Burzynski. In addition to the false advertising charges filed in January, the TMB alleged a host of dubious activities, including using antineoplastons to attract patients who he knew were ineligible for the clinical trials, charging them retainers before revealing that they were ineligible for the antineoplastons they wanted (essentially a bait and switch), exacting "exorbitant charges" from patients for services, and tricking patients into accepting care from unlicensed staff whom he misrepresented as licensed physicians. These allegations recur throughout the cases mentioned in the charges, and they were reported in *USA Today*.

It is clear that Burzynski's medical license is on the line again and skeptics have every reason to believe that the Texas Medical Board is throwing everything that it has at the clinic. Skeptics in the fight continue to make sure that the various agencies are talking to one another and to press their federal representatives to investigate how Burzynski not only got his clinical trials back but advanced to phase III trials. In June, skeptics visited Sen. Claire McCaskill's St. Louis office and had an hour-long meeting about the issue. McCaskill is chair of the Senate Subcommittee on Consumer Protection, Safety, and Insurance. They encourage other skeptics to visit their representatives' district offices, brief them, and put the staff in contact with McCaskill's office about this important issue.

Robert Blaskiewicz wrote the article "Skeptic Activists Fighting for Burzynski Cancer Patients" in our March/April 2014 issue. He teaches writing and literature in Eau Claire, Wisconsin, and has written widely on skeptical topics, including conspiracy theories, alternative medicine, and critical thinking.

Truth and Myth behind *Magic in the Moonlight*

Benjamin Radford

In the new Woody Allen film *Magic in the Moonlight*, Colin Firth (*Apartment Zero*, *The King's Speech*) plays a master magician named Stanley who is asked by a friend to join him in the French Riviera to investigate a fetching young woman named Sophie (Emma Stone), who claims to have psychic powers, including prophecy and speaking to the dead. Sophie may or may not be truly psychic, but Stanley has a secret of his own: he performs as a Chinese magician named Wei Ling Soo, and no one knows of his alter ego. (See p. 63 for a brief review.)

Writer/director Allen has done his homework, and many of the details in the film, especially about the role of magicians in investigating—and often

Bigfoot DNA Data Disappoints and Reveals Surprise

Sharon Hill

A paper published in a prestigious journal announced the highest-quality data so far aimed to answer the question, "What is the Yeti?" The highly anticipated paper from genetics researcher Bryan Sykes of the University of Oxford regarding the DNA testing of anomalous primates was published in early July 2014 in the *Proceedings of the Royal Academy B* and made freely accessible to the public.

In 2012, a team from the University of Oxford and Lausanne's Cantonal Museum of Zoology put out a general call for samples of suspected anomalous primates–Yeti, Bigfoot/Sasquatch, Almasty, Orang-pendek. The samples, if acceptable for analysis, would be genetically tested using a cleaning method, previously vetted in the *Journal of Forensic Science,* that removes all traces of surface contaminants (most likely human) to get to the original DNA sequence. A specific portion of the DNA was used—the ribosomal mitochondrial DNA 12S fragment—for comparison to sequences in the worldwide genetic database GenBank.

A total of fifty-seven samples were received by Sykes and his team. Two samples were actually not animal hair: one was plant material, the other was glass fiber. Thirty-seven of the samples were selected for genetic analysis. Eighteen were from eight U.S. states: Arizona, California, Minnesota, Oregon, Texas, and Washington—believed to be the prime habitat of Bigfoot/Sasquatch. Eight samples were anticipated to be the Almasty (a hairy wild man creature) from Russia. Three samples were collected in the Himalayan region of Asia; one from Sumatra, supposedly representing the Orang-pendek.

Unfortunately, there were no anomalous primates in the lot of results. The sequences all matched 100 percent, and there were no "unknowns." Only one of the samples, from Texas, was found to be human. That only one matched with humans is a testament to the rigorous cleaning method that removed ubiquitous contamination. In the paper, Sykes noted that human contamination often "confounds the analysis of old material and may lead to misinterpretation of a sample as human or even as an unlikely and unknown human x mammalian hybrid" (in reference to the Melba Ketchum et al. study that was roundly discredited). While the Sykes et al. paper lists Ketchum as a reference, it is only to cite it as a poor study, not within the valid body of scientific literature, with misinterpreted results. The Sykes et al. study is regarded as the first serious study regarding anomalous primate DNA.

All the U.S. samples turned out to be not

exposing—fraudulent mediums are exactly correct. The film is set in the 1920s when séances were often held by fashionable (and wealthy) families; Ouija boards, three-legged tables, candles, and other accoutrements were used to try to contact the dead. Usually the communication took the form of knocks or raps heard in response to questions from mediums in darkened rooms (typically one thump meant yes and two thumps meant no).

American belief in communication with the dead rose dramatically in the 1800s, and the notion of spirits rapping out communication in telegraph style dates back to at least the mid-1800s. In the early 1840s in Hydesville, New York, a young peddler arrived at the home of a Mr. and Mrs. Bell to sell his housewares. He was invited into the home by the Bells' housekeeper and stayed for some days. The maid was shortly dismissed from service but abruptly rehired a week later. The peddler was gone, but many of his items were now in use in the Bells' kitchen. The maid thought little of it until she began experiencing strange, ghostly phenomena, and found out from the peddler's ghost that he had in fact been murdered in her absence.

Fraud or no, the sisters had inadvertently founded a religion called Spiritualism.

At least that was the story told by two sisters named Maggie and Katie Fox, who claimed to communicate with the peddler's ghost through taps and knocks. The Fox sisters became famous across the country and in Europe for their ability to communicate with spirits of the dead, drawing enthusiastic crowds for decades. Years later, however, the sisters admitted it had all been a hoax. There was no murdered peddler, and the spirit communications had been faked. The girls—who few suspected of trickery—had created hidden knocks with their feet. Fraud or no, the sisters had inadvertently founded a religion called Spiritualism, which is still practiced today. Decades later

anomalous but instead extant animals such as cow, horse, black bear, dog/wolf, sheep, raccoon, porcupine, or deer. The Russian samples were also disappointing in that they did not reveal a unique Almasty signature. Samples of raccoon and American black bear were among the Russian samples indicating either a mistake in the location of the samples or that individuals of these animals were imported to Russia at some point and their samples left behind.

Sadly, the Orang-pendek sample from Sumatra turned out to be from a Malaysian tapir. The Orang-pendek is considered to be a plausible cryptid—likely a new species of primate. However, this test failed to provide support for that idea.

The Nepal sample turned out to be a native goat, a serow. However, the other two Himalayan samples were the most interesting of all. Not one but two samples, those from Ladakh, India, and Bhutan, matched a fossilized genetic sample of *Ursus martimus,* a polar bear of the Pleistocene era, 40,000 years old. There was not a match with the modern species of polar bear. Thus, the study actually did reveal an unexpected anomaly. Future research will continue to look for more evidence of the representative animal, hopefully a living one.

Is the Yeti a bear? This previously unknown hybrid bear may contribute to the Yeti legend. The look and behavior are reportedly different from the other native bears. *Yeti* is a very general term and its description varies across the huge expanse of the world where it is reported to exist. It may not be just one animal. It is feasible that this new bear, if confirmed, constitutes one version of the Yeti. Sykes has been open in stating that it does not mean a primate version of the Yeti is not out there. It just means this result was not supportive of that idea. Yet, the evidence continues to point to less extraordinary conclusions than an unknown primate.

Many Yeti enthusiasts were dismayed at Sykes's results. While one paper will not kill the enthusiasm of anomalous hominid hunters, the main thrust of this paper hits the gut of cryptozoology. As it is practiced today by amateur Bigfoot hunters and monster trackers, it is not science. Sykes told NBC News that the work of American Bigfooters was inadequate: "It just wasn't science. A lot of Bigfoot enthusiasts thought that this was how science worked, [but] it was dreadful." Sykes's paper represents science. It's a high bar. This project was a fine example of amateurs working with professionals—exactly what needs to be done to make real discoveries. Sykes plans to release a book on the project in the near future and organize an expedition to the Himalayas next year to look for a live specimen of the anomalous bear.

Sharon Hill is the editor of DoubtfulNews.com.

Emma Stone portrays a psychic medium in Woody Allen's *Magic in the Moonlight*.

many self-proclaimed psychic mediums would continue the practice, pretending that knocks in darkened séance rooms came from the spirit world instead of from the medium or his or her employees.

For well over a century many mediums have been caught faking spirit communication, often by magicians—who, unlike laypeople and scientists, were ideally suited to spot trickery, being well-versed in techniques of distraction and illusion. In fact, Harry Houdini exposed many psychics as frauds who used trickery to make vulnerable people believe in the reality of spirit messages. (For more on this, see Massimo Polidoro's 2001 book *Final Séance*.) Many psychic mediums were exposed as frauds, including Eusapia Palladino, Mina "Margery" Crandon, Anna Eve Fay, the Bangs Sisters, Henry Slade, the Davenport Brothers, and others.

Again, Allen did his research; Firth's character, Stanley Crawford/Wei Ling Soo is a composite of several real historical figures, including Houdini and William Ellsworth Robinson, an Englishman who adopted a Chinese persona and the stage name Chung Ling Soo to capitalize on the popularity of Orientalism at the time. Robinson, as Soo, never spoke English and even had a person interpret for him during press conferences to take reporters' questions. The illusion tricked the public, and very few people knew that Chung Ling Soo was an elaborate hoax—until one day in 1918 when a bullet-catching trick went awry and the magician was fatally shot onstage. He died at the hospital soon after, and that's when Robinson's greatest secret was revealed.

For well over a century many mediums have been caught faking spirit communication, often by magicians—who, unlike laypeople and scientists, were ideally suited to spot trickery, being well-versed in techniques of distraction and illusion.

As for why Woody Allen chose this subject, the press notes explain: "Allen has been fascinated with magic since he started performing tricks as a teenager, and since then magic and magicians have often made appearances in his work. . . . Spiritual mediums were all the rage during the 1920s, when *Magic in the Moonlight* is set. 'At the time much was made of it,' says Allen. 'Very renowned people like [Sherlock Holmes creator] Arthur Conan Doyle took it very seriously. There were all kinds of incidents like spirit photographs that people were wondering about. Séances were very common.' The greatest magician of that era, Harry Houdini, attended many séances, debunking every clairvoyant he encountered. Interestingly, Houdini wasn't motivated by a desire to expose con artists, but by his sincere longing to discover that communicating with the dead was possible. Finding so much fraud was a disappointment to him, but at the time of his death, he still held out hope for an afterlife."

Like Houdini (and the fictional Stanley Crawford), William Robinson actually did go undercover to séances to investigate and reveal trickery in claims of talking to the dead. They did not debunk the fake psychics merely for the sake of debunking, but because the mediums would often exploit grieving families who truly believed that they were communicating with their dead loved ones. Some would ask high fees to conduct the séances; others would merely ask their wealthy patrons for "donations" or introductions to other prominent people. As *Magic in the Moonlight* shows, in many ways both the mediums and the magicians who exposed them were in the same business: creating illusions for pay.

Benjamin Radford is author, coauthor, or contributor to twenty books, including his latest, *Mysterious New Mexico: Miracles, Magic, and Monsters in the Land of Enchantment* (University of New Mexico Press, 2014).

Victor Stenger, Physicist, Prolific Author of Books on Naturalism, 1935–2014

Kendrick Frazier

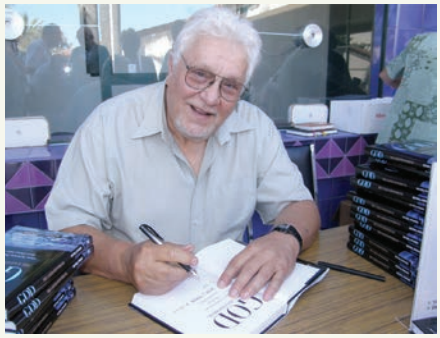
Victor J. Stenger, physicist and prolific author of books on both science and atheism, died August 27, 2014, in Hawaii. He was seventy-nine. His wife of more than fifty years, Phyllis, said the cause of death was an aneurysm next to his heart.

He was a longtime fellow of the Committee for Skeptical Inquiry.

Stenger was perhaps best known for his best-selling 2007 book *God: The Failed Hypothesis*, which addressed the question of the existence of God head-on from a scientific perspective. With it he joined that small group of authors who some call "the new atheists." In the foreword to the paperback edition (2008), Christopher Hitchens called it "a marvelous book" and welcomed the case Stenger makes "that the god hypothesis has actually been conclusively discredited." In a postscript, Stenger said some of the book's success was "good timing," appearing just when "the public was becoming aware of the corrosive effects extremist religion has had" in recent years. He responded to several criticisms and said believers should be reassured by his insistence that "scientists are not dogmatically opposed to God. Instead scientists are required by the very nature of science to go wherever the data lead."

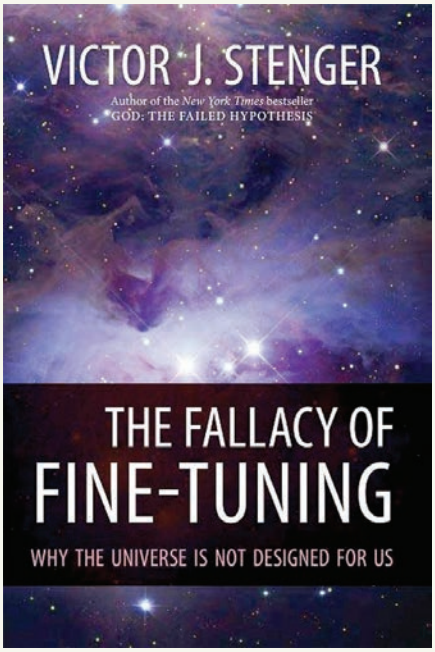
But Stenger's books also covered a wide range of scientific topics in physics and cosmology, and as a scientific skeptic he was active in explaining and debunking a variety of misconceptions regarding such things as the anthropic principle, the "fine-tuning" argument, and misunderstandings about and mystical interpretations of quantum mechanics.

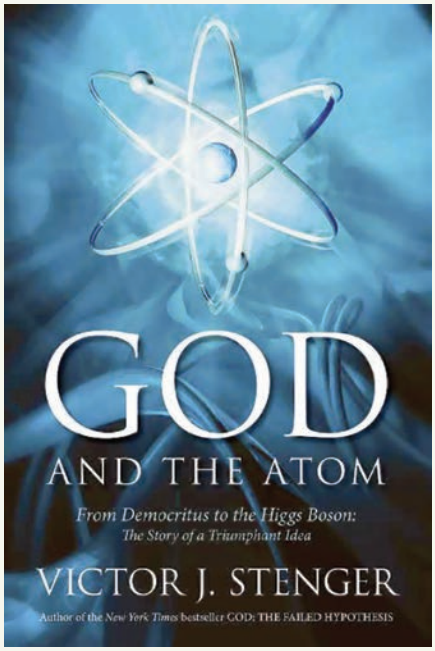
Stenger was emeritus professor of physics at the University of Hawaii and an adjunct professor of philosophy at the University of Colorado. His research career spanned the period in particle physics in which the so-called standard model came to the fore. He participated in experiments that helped establish the properties of strange particles, quarks, gluons, and neutrinos and also helped pioneer the fields of very-high-energy gamma ray and neutrino astronomy. His last research collaboration before retiring involved the underground experiment that showed neutrinos have mass.



Victor J. Stenger

In recent years Stenger had produced a steady output of books of direct relevance to both the skeptic and humanist communities. His new book G*od and the Multiverse: Humanity's Expanding View of the Cosmos* (see New and Notable, p. 60), was published September 9, just two weeks after his death. He had been actively promoting it. It


VICTOR J. STENGER
Author of the New York Times bestseller
GOD: THE FAILED HYPOTHESIS
THE FALLACY OF
FINE-TUNING
WHY THE UNIVERSE IS NOT DESIGNED FOR US


GOD
AND THE ATOM
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The Story of a Triumphant Idea
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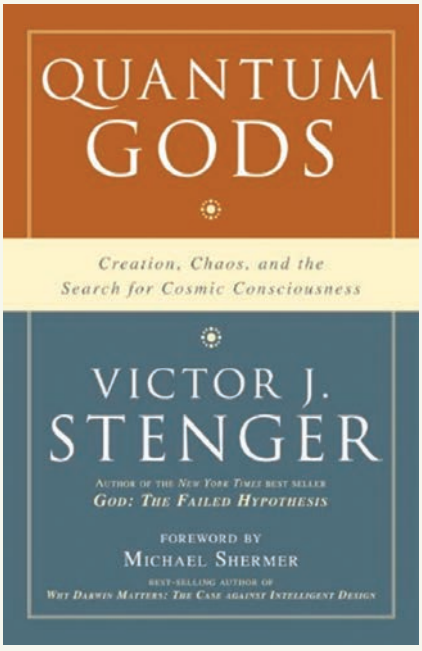

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was preceded by *God and the Atom: From Democritus to the Higgs Boson* (2013), *The Fallacy of Fine-Tuning: Why the Universe Is Not Made for Us* (2011), *Quantum Gods* (2009), and *The New Atheism* (also 2009). All were published by Prometheus Books. The latter book, subtitled "taking a stand for science and reason," he dedicated to Paul Kurtz, "who has contributed more to the advance of science and reason than any other of his generation."

His 1995 book *The Unconscious Quantum* took readers through the development and paradoxes of quantum mechanics and criticized metaphysical fads popularized by authors such as Deepak Chopra and Fritjof Capra. Here, and in his later books, he emphasized that current scientific hypotheses about the material nature of reality are all that's needed to explain the available evidence and that mystical notions tell us more about human needs to believe in something than anything about the outside world. *Timeless Reality*, which dealt with symmetry, simplicity, and his first look at the idea of multiple universes, came in 2000.

"One thing I liked about Vic was his lack of pretense and posturing. He didn't trim his arguments—or his beard—to please others. He was interested in determining the truth. Period. What others thought of his occasionally rumpled look or his refusal to soft-pedal his arguments was a matter of indifference to him."

—Ronald A. Lindsay
President, Center for Inquiry

Ronald A. Lindsay, president and CEO of the Center for Inquiry and the Committee for Skeptical Inquiry, issued this statement:

> With Vic Stenger's death, the secular and skeptic communities have lost an articulate, knowledgeable, and relentless defender of the naturalistic, scientific worldview. Vic's intellectual output was prodigious, especially in the last decade, when he turned out book after book hammering away at fallacious arguments for God's existence, such as the notorious "fine-tuning" argument. Vic's background as a physicist made him a formidable advocate for naturalism: he could quickly spot flaws in his opponent's arguments and then specify precisely where his opponent had erred.
>
> Vic had a long association with the Center for Inquiry family of organizations. He was a fellow of both the Center for Inquiry and the Committee for Skeptical Inquiry; he was also a frequent contributor to our magazines, *Free Inquiry* and Skeptical Inquirer, and spoke at many of our conferences.
>
> One thing I liked about Vic was his lack of pretense and posturing. He didn't trim his arguments—or his beard—to please others. He was interested in determining the truth. Period. What others thought of his occasionally rumpled look or his refusal to soft-pedal his arguments was a matter of indifference to him.
>
> We'll miss both his intellect and his intellectual integrity.

Four Emmy Awards to *Cosmos*

We noted in our last issue's cover article, which featured two interviews with Ann Druyan, that her new *Cosmos: A Spacetime Odyssey* television series had garnered twelve nominations for Emmy awards.

The award ceremony for the Creative Arts Emmys was held in August, and the *Cosmos* series, hosted by Neil deGrasse Tyson and shown on Fox and National Geographic channels, received four Emmy trophies.

Ann Druyan accepts her Emmy.

Ann Druyan and Steven Soter were awarded the Emmy for Outstanding Writing for Nonfiction Programming. Alan Silvestri won one Emmy for his *Cosmos* music score and another for his original main title theme music. The series, executive produced by Seth McFarlane, also received the Outstanding Sound Editing Emmy for Nonfiction Programming for the episode "Standing Up in the Milky Way."

10,000 Hours Practice? Not the Key to Expert Performance as Contended

Kendrick Frazier

Does expert performance in games, music, and sports depend largely on thousands of hours of practice? Are the differences between high performers and ordinary ones explained by that amount of practice?

Starting two decades ago, psychologist K. Anders Ericsson and his colleagues published the first of several influential studies that showed the cumulative amount of deliberate practice for musicians was much higher for the most-accomplished groups than for the less-accomplished ones. By age twenty, the "best" violinists, for instance, had practiced for 10,000 hours. The figure for "good" violinists was 7,800 hours, and for the least-accomplished ones it was 4,600 hours.

"Many people really like the idea that with practice anyone can accomplish anything and do not want to believe anything different."

Science writers such as Malcolm Gladwell in his 2008 best-selling book *Outliers* popularized this view that 10,000 hours of practice was what separated top-performing groups from lesser ones (among his memorable case studies were The Beatles and Bill Gates). Other books as well have been inspired by what Gladwell called the "10,000-hour rule."

But is this view supported by empirical evidence? There is considerable reason for skepticism. Psychologists and others have criticized the idea. Some said the studies didn't really establish that a great deal of practice is sufficient for great performance or that innate talent doesn't play a large role. Others suggested that more talented people practice more; lesser talents stop practicing, realizing they aren't improving.

To answer the key question, three academic psychologists have now completed and published a meta-analysis covering all major domains in which deliberate practice has been investigated: music, games, sports, professions, and education. It is the first formal meta-analysis addressing the relationships.

The new study was conducted by Brooke Macnamara of Princeton University (now at Case Western Reserve University), David Hambrick of Michigan State University, and Frederick Oswald of Rice University and published in July in the respected journal *Psychological Science* ("Deliberate Practice and Performance in Music, Games, Sports, Professions, and Education: A Meta-Analysis," *Psychological Science*, 25: 1608–1618, 2014).

They sought to answer a specific question: How much of the total variance in performance is explained by the accumulated amount of deliberate practice?

Macnamara and colleagues used agreed-upon criteria for meta-analyses (studies of studies). They set up systematic criteria for assessing performance and estimating hours of deliberate practice (from interviews, questionnaires, and logs) and did a comprehensive search of the research literature.

They found 9,331 potentially relevant articles, and from those identified eighty-eight studies that met all the inclusion criteria. They involved a total of 11,135 participants.

They found that there was a correlation between deliberate practice and performance, but it was far smaller than had been suggested. Here are their specific results: Deliberate practice explained 26 percent of the variance in performance for games (chess, etc.), 21 percent for music, 18 percent for sports, 4 percent for education, and less than 1 percent for professions.

In other words, factors other than amount of practice account for the majority of the variance in performance, and that is true for each domain studied.

Thus practice is important—but not nearly as important as the promoters of the 10,000-hour effect suggest. The psychologists summarized the findings this way: "We conclude that amount of deliberate practice—although unquestionably important as a predictor of individual differences in performance from both a statistical and a practical perspective—is not as important as Ericsson and his colleagues have argued."

"There have been reactions to this paper," lead author Brooke Macnamara told the Skeptical Inquirer. "Many people really like the idea that with practice anyone can accomplish anything and do not want to believe anything different," she said. "Our results suggest that practice, while undeniably important, is not enough to largely account for the differences in performance among individuals. We have made all of our data publicly available so that anyone can see the data, replicate our meta-analysis, or conduct their own analyses."

What does account for the larger part of the variations in performance? Their research doesn't address that, but possible factors include starting age (evidence suggests that there may be an optimal development period for acquiring complex skills, just as for acquiring language); general intelligence; working memory capacity; and specific (innate?) abilities. A fertile area for research lies ahead. In the meantime, a proposition that seemed to be gaining almost mythlike acceptance has suffered a considerable empirical setback.

Kendrick Frazier is editor of the Skeptical Inquirer.

Superstition May Have Caused Three-Car Accident

Benjamin Radford

A man fainted while holding his breath as he drove through a tunnel near Portland, Oregon, in late May 2014, causing a head-on collision that sent four people to the hospital. The driver, Daniel Calhon, lost consciousness and swerved his car into oncoming traffic. Calhon, his passenger, and two others sustained non–life-threatening injuries; occupants in a third vehicle involved were not injured.

Calhon was cited for reckless driving, reckless endangerment, and assault. He has not explained why he held his breath while driving through the tunnel, but police suggested that it was done as part of a superstitious ritual. In many areas it's a popular thing to do and is associated with good luck or a wish coming true. CarMax, the auto sales giant, sent out an April 25, 2014, tweet informing customers that "Holding your breath while driving though a tunnel is our favorite driving superstition." Other common travel superstitions include holding your breath while passing by a graveyard (lest you accidentally inhale a lost soul) and stepping onto a train or ship with the right foot first.

A Dictionary of Superstitions, edited by Iona Opie and Moira Tatem, states that "An old superstition is if you speak under a tunnel or bridge you must touch a green object or you will get bad luck. It is still believed now." There are many regional variations of such legends with elements added or dropped from the story. In modern times successfully holding one's breath throughout a (hopefully brief) tunnel journey may be substituted for touching a green object, for example.

Travel superstitions have ancient roots. As folklorist Claudia de Lys writes in her *Giant Book of Superstitions*, "Modern travelling superstitions, such as not wanting to leave the ground, not sleeping in an upper berth, and sitting backwards on a train, are in essence not far removed from the inexplicable forebodings which assailed early and ancient man when faced with a journey. These strange premonitions [stem] from a sense of insecurity, when no apparent danger exists." Fear and insecurity are indeed closely tied to superstitions: fear of bad luck and insecurity in the future.

Fear and insecurity are indeed closely tied to superstitions: fear of bad luck and insecurity in the future.

Superstitions, of course, don't need to be true to be widely believed. If a lucky penny or rabbit's foot truly assured good luck or victory over adversity, then every gambler, investor, and athlete would be dripping with them. Though superstitions are often harmless (there's no danger in carrying a lucky penny or knocking on wood after saying something hopeful), under some circumstances the threat of danger is very real.

LinkedIn

LinkedIn Skeptics Group

A new LinkedIn discussion group specifically for skeptics has been recently formed.

The group's purpose is to discuss issues raised and articles published in Skeptical Inquirer and other skeptical and humanist fora.

To join, enter "The Skeptics Convention" in your LI search box and proceed to the group.

Martin Gardner was born one hundred years ago, on October 21, 1914. To commemorate the centennial of the birth of one of the greatest figures in modern scientific skepticism, the Skeptical Inquirer plans to republish several of his classic SI "Notes of a Psi-Watcher" columns over the next several issues. We later changed the column's title to "Notes of a Fringe-Watcher." We begin with his very first column, from our Summer 1983 issue. "Lessons of a Landmark PK Hoax" was "a few general comments" on James Randi's elaborate Project Alpha, which Randi described in an article in the same issue. Randi had arranged for two young conjurors to visit the McDonnell Laboratory for Psychical Research at Washington University, St. Louis. During two years of experiments with them, the head of the lab, physicist Peter Phillips, became convinced that the two teenaged magicians, Steven Shaw and Mark Edwards, could bend metal objects, cause light streaks on film, turn a motor under a glass dome, make fuses blow, and perform other similar wonders all with the power of their minds. Randi's intention was to demonstrate that parapsychology-minded scientists would resist accepting expert conjuring assistance in designing proper controls and therefore be easily fooled by magic tricks. When revealed as a hoax, the revelations garnered worldwide media coverage and greatly embarrassed the lab. It closed in 1985. In 1986, Randi was given a MacArthur Foundation award to continue his work in debunking fraudulent claims. Here is Gardner's column.

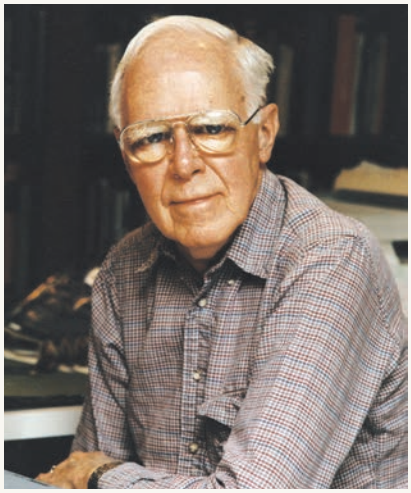
Lessons of a Landmark PK Hoax

MARTIN GARDNER

Was Randi's Project Alpha unethical? I think not, but before explaining why let's consider a few past instances in which deception was used to demonstrate the incompetence of researchers.

Early this century René Blondlot, a respected French physicist, announced his discovery of a new type of radiation, which he called N-rays, after the University of Nancy where he worked. Dozens of papers on N-rays were soon being published in France, but American physicists were dubious. One skeptic, a physicist at Johns Hopkins University, Robert W. Wood, enjoyed playing practical jokes, especially jokes on spirit mediums. His humorous book *How to Tell the Birds from the Flowers* is still in print. Perhaps you have seen on TV a little pinheaded, bald creature with a huge flexible mouth that is produced by painting eyes and a nose on someone's chin, then viewing the chin upside down. It was Wood who invented this whimsical illusion.

In 1904 Wood made a trip to Nancy to observe N-ray research firsthand. In one experiment he secretly removed from the apparatus an essential prism. This had no effect on what the experimenters said they were observing. In another test Wood surreptitiously substituted a piece of wood for a steel file that was supposed to be giving off N-rays. The imagined radiation continued to be reported by the Nancy scientists. Wood told his hosts nothing about either prank. Instead, he went home and wrote a devastating account of his visit for the British magazine *Nature*. It was a knockout blow to N-rays everywhere except at Nancy.



The reaction of the Nancy group to Wood's disclosures was well summed up by Irving Klotz in his fine article "The N-ray Affair," *Scientific American*, May 1980:

> According to Blondlot and his disciples, then, it was the sensitivity of the observer rather than the validity of the phenomena that was called into question by criticisms such as Wood's, a point of view that will not be unfamiliar to those who have followed more recent controversies concerning extrasensory perception. By 1905, when only French scientists remained in the N-ray camp, the argument began to acquire a somewhat chauvinistic aspect. Some proponents of N-rays maintained that only the Latin races possessed the sensitivities (intellectual as well as sensory) necessary to detect manifestations of the rays. It was alleged that Anglo-Saxon powers of perception were dulled by continual exposure to fog and Teutonic ones blunted by constant ingestion of beer.

When N-rays became a huge embarrassment to French science, the journal *Revue Scientifique* proposed a definitive test that would settle the matter. "Permit me to decline totally," Blondlot responded, ". . . to cooperate in this simplistic experiment. The phenomena are much too delicate for that. Let each one form his own personal opinion about N-rays, either from his own experiments or from those of others in whom he has confidence." Like Percival Lowell, the American astronomer who drew elaborate maps of Martian canals, Blondlot could not prevent his strong desires from strongly biasing his observations. He lived another quarter-century. If he had any doubts about N-rays, so far as I know he never expressed them.

Move ahead to 1974. J. B. Rhine had appointed Walter J. Levy, 26, his successor as director of his laboratory.

Levy was already famous in psi circles for his "carefully controlled" investigations of animal-psi. (One of them suggested that embryos in chicken eggs had psychokinetic [PK] powers.) Three older members of Rhine's staff were suspicious of Levy's string of successes. What did they do? They set a cruel trap. While Levy was testing the PK ability of rats to alter a randomizer, they watched through a peephole and saw Levy repeatedly beef up the scores by pulling a plug. Better yet, they installed another set of instruments, without Levy's knowledge, that kept an accurate score. The untampered record showed no evidence of PK. Levy confessed, and vanished from the psi scene.

To me the saddest aspect of this scandal was not Levy's deserved disgrace but the fact that it had never occurred to Rhine to check on Levy's honesty. Rhine himself was deeply shaken by the revelations. If the trap had not been set, Levy's papers would still be cited as strong evidence for animal-psi.

There are two reasons why traps to detect fraud are more essential in PK research than anywhere else. First, the claims are far more extraordinary and therefore require much stronger evidence. Second, the field has always been soaked with fraud. In the days when eminent physicists were convinced of the reality of floating tables and glowing ectoplasm, an enormous service to science was performed by Houdini and others who were willing and capable of setting traps for the mediums.

This brings us to the main moral of Randi's hilarious hoax. Paranormal metal-bending is so fantastic a violation of natural laws that the first task of any competent experimenter is to determine whether a psychic who bends spoons is cheating or not. In England, when physicists John Taylor and John Hasted were convinced that scads of children could twist cutlery by PK, one would have expected the two scientists to devise some elementary traps, but they did not. The only good trap was set by two sociologists at the University of Bath who did not even mean to set it. Puzzled by the fact that no one ever *sees* metal bend—Taylor called it the "shyness effect"—they put some spoon-bending youngsters in a room, then filmed them through a one-way mirror. The purpose was not to embarrass the children, but to record the shyness effect. To their amazement, they saw the children cheating. Taylor soon became disenchanted, but such revelations had no effect on Hasted's mind-set. Some spoon benders cheat, so what? Not in *his* laboratory. You can read all about his naive experiments in his recently published book, *The Metal Benders.*

Hasted and Phillips typify psychic research at its shabbiest. In spite of many letters from Randi telling him that his two young subjects were frauds, Phillips made no effort to check on their backgrounds. Not until the very end, after Randi had severely criticized his videotapes, did he start to tighten controls. Of course the wonders ceased. On many occasions when controls were unbelievably lax, the two "psychics" suspected a trap. It was never sprung. They overestimated the acumen of their monitors.

Think what the results might have been had the boys decided to become professional psychics. They would have left Phillips's lab complaining that excessive controls were inhibiting their powers. Soon they would be appearing on TV documentaries as wonder workers whose powers had been validated by respected scientists. Uri Geller never tires of talking about how the Stanford Research Institute (now SRI International) validated his psychic abilities. Phillips's two young subjects are even better than Geller. One of them invented a way to make one tine of a fork visibly and unshyly bend that is superior to any of Geller's crude methods. When Steven Shaw demonstrated this lovely illusion at Randi's Manhattan press conference, the entire audience gasped. "Can you tell us how you did that?" a startled reporter asked. Shaw walked to the mike and said, "I cheat." It brought down the house.

It is to Phillips's credit that he had the courage to say (*Washington Post*, March 1, 1983), "I should have taken Randi's advice." It is to the credit of Stanley Krippner, a true believer in PK if ever there was one, that he called Randi's project "a much-needed" experiment. It remained for former CSICOP member and sociologist Truzzi to start the hue and cry about entrapment. Truzzi had known about Randi's trap almost from the beginning, but had carefully kept his own trap shut. "Randi is hurting the field with his gross exaggeration," Truzzi told the *New York Times* (February 15, 1983). "In no way will his project teach psychic researchers a lesson and make them more likely to trust to magicians' advice. Quite the contrary. This outside policeman thing sets up magicians as the enemy."

On this point Truzzi may be right. I, too, would be surprised if psychic researchers suddenly decided to study conjuring or to seek the active help of knowledgeable magicians. Conjurors are indeed the enemy. Their bad vibes alone are enough to kill any PK powers just by being there as observers; perhaps (as has actually been suggested by the sociologists at Bath) even their *reading* about the experiments afterwards influences the outcome by backward causality! But perhaps Randi's scam will have a salutary effect on funding. After all, the half-million bucks the McDonnell Foundation gave to Washington University could have gone to worthwhile research instead of down the drain to a group unqualified to investigate metal bending.

Am I saying that all psychic researchers should be trained in magic, or seek the aid of magicians, before they test miracle workers? That is exactly what I am saying. The most eminent scientist, untrained in magic, is putty in the hands of a clever charlatan. Without the help of professional deceivers—the conjurors—no testing of a superpsychic is worth ten cents of funding. That is the big lesson of Randi's hoax. That is why it is likely to become a landmark in the history of PK research. ■

[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell is CSI's senior research fellow. A former stage magician, private investigator, scholar (PhD in English, with an emphasis on literary investigation and folklore), and forensic writer, he is author of numerous books, including *The Science of Miracles* (2013).

Era of the Flying Saucers

Pilot Kenneth Arnold's sighting of nine streaking objects near Mount Rainier in Washington state on June 24, 1947, described the objects as moving like "a saucer skipped across water" (qtd. in Ruppelt 1956, 27). This caused a reporter to dub them "flying saucers." Yet others claim the term originated in the previous century, when, indeed, there were also what would eventually be known as unidentified flying objects. Here is the story of the coming of the saucers.

Earlier 'Flying Saucer'?

Various sources agree with UFOlogist and ghost promoter Dennis William Hauck (1996, 42) regarding "flying saucers," that "The term had been used as early as 1878, by a farmer describing an object that passed over Denison, Texas." However, that statement is filled with misinformation, due to writers failing to seek out the reported source and instead copying from other writers.

The report in question did appear in the January 25, 1878, *Denison Daily News* of Denison, Texas; however, in searching out that source, one learns *it was reprinted from another paper*, namely the *Dallas Herald* (sic), as indicated by a notation at the bottom of the article. (Actually, the original source was *The Dallas Daily Herald*, just two days earlier ["A Strange Phenomena" (sic) 1878].) So the reference to an object being seen from a farm "some six miles north of this city," refers to Dallas, not Denison ("A Strange Phenomenon" 1878).

The farmer was paraphrased as stating that when he first noticed it, it was about the (comparative) size of an orange, but when overhead it "was about the size of a large saucer," moving with considerable speed. Given its "peculiar shape," the newspaper continued, he "thought that it resembled, as well as he could judge at such a distance, a balloon, which seemed to him to be the most reasonable solution of the strange phenomena."

Although the article describes what some would today consider a UFO, it nowhere contains the words *flying saucer* and, indeed, specifically indicates it was neither saucer shaped, nor (like Kenneth Arnold's objects) moving in the manner of a skipped saucer. The word *saucer* was only invoked to indicate (very imperfectly) the object's size—not its real size (that of a balloon), but its apparent size if a saucer were held up for a two-dimensional comparison.

Saucers, Discs, and UFOs

So the term *flying saucer* was actually coined in 1947. Arnold told a reporter of a Pendleton, Oregon, newspaper, the *East Oregonian*, that the crafts were "saucer-like" (Bequette 1947), and headline writers later began to refer to "flying saucers" (Clark 1998, I:40). (Arnold also reportedly told the *Chicago Daily Tribune* the objects were "shaped like a pie plate," but that was not precisely true, since he later specified that, although they were wide and flat, one was crescent-shaped and the other eight had pointed trailing edges [Gross 2001].) Before long, *flying saucer* began to make it into dictionaries (e.g., *Webster's* 1951, 253). Almost immediately, "flying disc" (or "disk") became a synonym for "flying saucer" (*Webster's* 1951, 253), as did "flying object," "flying light," even "flying whatsit" (Clark 1998, 2: 1064; Keyhoe 1950, 53). Sometimes the term was simply shortened to "saucer"—whether as an adjective ("saucer crashes") or noun ("sausage-like saucer"). There were numerous word extensions, variants, and whimsies: "Project Saucer," "Great Flying Saucer Scare," "flying saucer," "saucerian," "saucer-men" (extraterrestrials), "saucerlike," "saucer-shaped," and so on and on. The late James Moseley, a put-on artist of UFOlogy and publisher of *Saucer Smear*, even pretended to represent an organization named SAUCERS (an acronym for Saucer And Unexplained Celestial Events Research Society) (Clark 1998, 2: 816, 817, 1064; Peebles 1995, 40, 56; Wilkins 1954, 46, 127; Sheaffer [1980] 1986, 52). A critic (Ruppelt 1956, 27) referred to "the bards of saucerism" (i.e., proponents). The term *saucerology* came more recently (Sachs 1980, 282).

The saucers inspired seemingly

endless books on the subject, the earliest of which was Donald E. Keyhoe's *The Flying Saucers Are Real* (1950). Keyhoe (1897–1988) was a retired Marine Corps pilot turned freelance writer. In 1949, *True*, the men's magazine, assigned Major Keyhoe to a saucer story, and his resulting article in the January 1950 issue was expanded into a paperback book written in "the breathless, pulpy style that would characterize all of his UFO books"—including *Flying Saucers from Outer Space* (1953), *The Flying Saucer Conspiracy* (1955), *Flying Saucers: Top Secret* (1960), and *Aliens from Space* (1973) (Clark 1998, 1: 558–561).

As reports came in, it was found that "saucers" could be any shape—e.g., a "cigar-shaped" saucer, a "saucer" as "a large sphere," and so on (Wilkins 1954, 127, 250). Therefore, later, as a replacement term, *unidentified flying object* (UFO) was created by Captain Edward J. Ruppelt (1956, 7), head of Project Blue Book, the USAF's saucer probe. (The investigative group was formed in March 1952 out of the earlier Project Grudge, itself replacing Project Sign, which began January 22, 1948.) Any UFO that subsequently became identified was known as an IFO—the acronym for *identified flying object*. As with "flying saucer," "UFO" spawned other terms, "UFOlogy" (Sachs 1980, 334), "UFOlogical" (Klass 1974, 16), "UFOdom" (Sheaffer [1980] 1986, 123), and so on, including UFOlore, and UFOmania (defined as an "excessive and persistent tendency to apply the UFO label to any aerial phenomenon without making any effort to find a conventional explanation" [Sachs 1980, 334]).

UFO Incunabula

Ruppelt (1956, 31) observed of reports that "Within a few days of Arnold's sighting, others began to come in," and "The week of July 4, 1947, set a record for reports that was not broken until 1952." The following is a short list of what may be called the *incunabula* (early examples) of flying saucers, considered here as the years 1947 and 1948.

• *June 24, 1947: Arnold's "Flying Saucers."* UFO expert Major James McGaha (USAF retired) has identified these as probable "mountain-top mirages." (For a discussion, see McGaha and Nickell 2014.)

• *July 4, 1947: first photo.* What Ruppelt (1956, 32) describes as "the first photo" of a UFO was taken in Seattle. He states, "After much publicity it turned out to be a weather balloon."

• *July 8, 1947: Roswell Incident reported.* *The Roswell Daily Record* headlined, "RAAF [Roswell Army Air Field] Captures Flying Saucer on Ranch in Roswell Region," adding as a subhead, "No Details of Flying Disk Are Revealed." Subsequently dismissed as a weather balloon, it has since been identified as a spy balloon array, with dangling radar reflectors, from Project Mogul (which attempted to monitor sonic emissions from Soviet nuclear tests). (See Nickell 2009, 10.)

From the saucer's shape, fluid movement, and sightings by ground observers with telescopes, it has since been identified as a balloon, almost certainly a then-secret "Skyhook"—a huge, 100-foot-diameter balloon used for cosmic-ray research.

• *July 9, 1947: Encounter with alien beings.* Among the earliest saucer-occupant reports published following Kenneth Arnold's sighting, it was reported in the *Nashville Tennessean* (on the date given). In a letter to the editor, the alleged witness claimed he had encountered little men, "all heads and arms and legs, and glowing like fireflies." He said they exited their saucer to greet him with sign language, then reboarded and shot away in a dust cloud. Although the newspaper described him as "apparently perfectly sane and sober," saucer historian Jerome Clark (1998, I: 214) observes, "the story sounds more like a practical joke than a serious report."

• *Mid-July 1947: Maury Island, Washington, report.* A man identifying himself as a harbor patrolman was allegedly boating with his son and two crewmen on June 21 when he saw a group of donut-shaped saucers above. One showered a slag-like material and metallic flashes over them, killing his son's dog and injuring the boy's arm. The man's superior took some of the extraterrestrial material to Ray Palmer, publisher of *Amazing Stories*. He enlisted Kenneth Arnold to investigate, but Arnold was taken in by what proved to be a hoax, involving metallic stones picked up on the Maury Island beach. The two fake harbor patrolmen confessed to Air Force investigators that what began as a joke had escalated out of control (Sachs 1980, 191–192; Clark 1998, 2: 612–614; Peebles 1995, 14–17).

• *January 7, 1948: Pilot Killed Chasing Saucer.* Air National Guard pilot Thomas F. Mantell died as a consequence of chasing a saucer near Fort Knox, Ky. From the saucer's shape, fluid movement, and sightings by ground observers with telescopes, it has since been identified as a balloon, almost certainly a then-secret "Skyhook"—a huge, 100-foot-diameter balloon used for cosmic-ray research. Air Force investigators concluded Mantell flew too high in his non-oxygen-equipped plane and passed out, while his plane went into a spiral and crashed. (See

Saucers were off and soaring, aided by buffs and saucerologists who, as it often seemed, did not want cases explained but forever sought to keep them "unidentified."

Nickell 1995, 194.)

• *July 24, 1948: Chiles-Whitted sighting.* Eastern Airlines pilot Clarence Chiles and copilot John Whitted described a rocket-shaped saucer with lit windows and fiery exhaust near Montgomery, Alabama. Astronomer/saucerologist J. Allen Hynek suggested it was a meteor whose train gave the "subjective impression of a ship with lighted windows" (qtd. in Clark 1998, I: 183). Amateur astronomers reported numerous bright meteors on the night of July 23/24 (Peebles 1995, 25–27; Ruppelt 1956, 57–59). Consistent with a meteor was the ten-second length of the sighting (Peebles 1995, 26; cf. Hendry 1979, 64). Other such cases are known (see, e.g., Klass 1974, 8–12 and plates la-ld).

• *October 1, 1948: Gorman "dogfight" with flashing disc.* Twenty-five-year-old Air National Guard pilot George Gorman was landing at Fargo, North Dakota, when he engaged in a frantic "dogfight" with a saucer. But, as in several similar incidents, Gorman fought a lighted weather balloon as proved by an analysis by the Air Weather Service (Ruppelt 1956, 59–64).

• *Late November 1948 (continuing well into 1949): Green fireballs.* In the vicinity of Albuquerque, New Mexico, came reports of "green streaks" or "green flares" (thought possibly to be green signal flares). Then on the night of December 5 an Air Force C-47 crew saw a green fireball. The military was concerned because the area was involved in atomic weapons research and storage. Throughout December and the following January, sightings of green fireballs occurred nearly every night. Some thought the "flat" (horizontal) trajectory and green color precluded meteors, but a meeting of military officers and scientists concluded the green fireballs were indeed a natural phenomenon. As Ruppelt notes, greenish meteors do occur, and "when viewed from certain angles, a meteor can appear to have a flat trajectory." He adds "The reason so many had been seen during December of 1948 and January 1949 was that the weather had been unusually clear all over the Southwest during this period" (Ruppelt 1956, 66–78; Peebles 1995, 32–34).

Conclusions

Mirages, balloons, meteors, hoaxes. Ruppelt (1956, 15) also noted that many saucers were identified as airplanes, stars, and other "common objects." He concluded, "The people who make such reports don't recognize these common objects because something in their surroundings temporarily assumes an unfamiliar appearance." Moreover, as Mark Twain (1889) so brilliantly wrote, "[Y]ou can't depend on your eyes when your imagination is out of focus." Nevertheless, saucers were off and soaring, aided by buffs and saucerologists who, as it often seemed, did not want cases explained but forever sought to keep them "unidentified."

In that way they could at least continue to infer that, because the objects could not be "explained away," they were probably extraterrestrial craft. Of course this is illogical, merely another example of an "argument from ignorance"—"we don't know, therefore we do know." That is the way paranormal claims are typically promoted, little having changed in the many decades since the term *flying saucers* entered into America's—and the world's—vocabulary. ■

Acknowledgments

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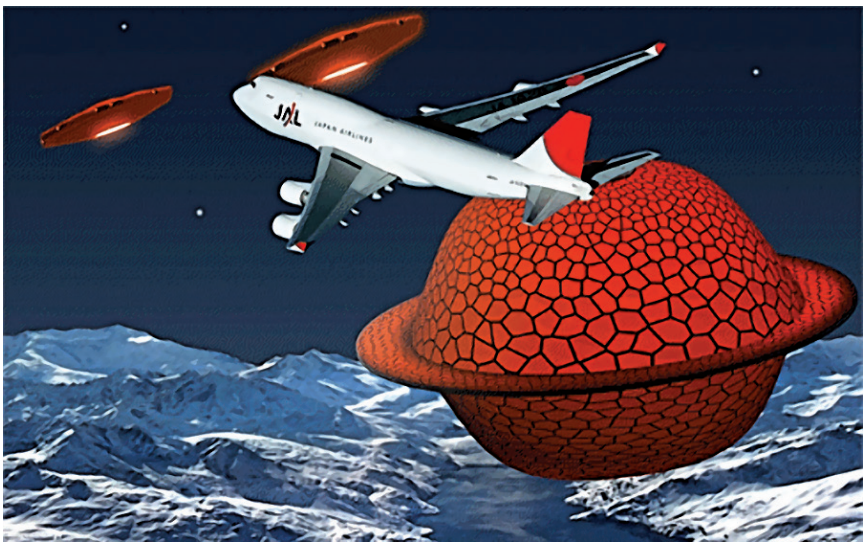
[PSYCHIC VIBRATIONS ROBERT SHEAFFER

Sheaffer's "Psychic Vibrations" column has appeared in the SKEPTICAL INQUIRER for more than thirty years; its highlights have now been published as a book (Create Space, 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

JAL 1628: Capt. Terauchi's Marvelous 'Spaceship'

A recent email circulating among certain UFO researchers asked: "Where is the best online skeptical explanation for the famous JAL 1628 UFO sighting by Capt. Terauchi on November 17, 1986?" Despite it being one of the most celebrated cases in recent UFO literature, it turns out there wasn't much to read. To remedy this situation, I scanned all of the press clippings and other papers in my file on the case and placed it on the Historical Documents page of my Debunker.com website (http://www.debunker.com/historical/historical.html). It contains original press clippings from when the case was first reported, a press release by CSICOP, FAA information, and a "Summary White Paper" about the case by Philip J. Klass. (Page numbers given here refer to this PDF document; MUFON, it turns out, has scanned some 377 pages relating to this case, now available in John Greenwald's *The Black Vault*: http://goo.gl/KakGf9.)

The San Francisco Chronicle reported on December 30, 1986, "The crew of a Japan Air Lines cargo jet claimed that a UFO with flashing white and yellow strobe lights followed them across the Arctic Circle in route from Reykjavik, Iceland, to Tokyo" (p. 1). On January 1, 1987, that paper reported, "A veteran pilot whose UFO sighting was confirmed on radar screens said the thing was so enormous that his Japan Air Lines cargo jet—a Boeing 747—was tiny compared with the mysterious object" (p. 2). In fact, Terauchi said that the object was as big as an "aircraft carrier." Feeling the heat, the FAA soon re-opened its investigation of the incident. "The reason we're exploring it is that it was a violation of airspace," said FAA spokesman Paul Steucke. "That may sound strange, but that's what it was" (p. 4).



http://badufos.blogspot.com/

A depiction of the JAL 1628 UFO.

The FAA reviewed its data and found reasons to doubt its earlier statements. By January 8, the press was reporting,

> The FAA has concluded that the unidentified object on radar now appears to be an unexplained split image of the JAL Boeing 747 and not a separate object. . . . The review of radar data indicates that no second object was present and represents a reversal of earlier FAA statements that a second object was confirmed on radar. "The bottom line is that this tells us that we don't have any radar confirmation of the object that the pilot said he saw," Steucke said. (p. 5)

The scanned documents from MUFON include a detailed technical analysis from the FAA of the "uncorrelated primary return" on the radar (MUFON pp. 50–53).

Philip J. Klass investigated, and soon CSICOP issued a press release, written by Klass (p. 7):

> At the time the UFO incident began near Ft. Yukon, the JAL airliner was flying south in twilight conditions so that an extremely bright Jupiter (-2.6 magnitude) would have been visible on the pilot's left-hand side, where he first reported seeing the UFO, according to Klass. Jupiter was only 10 degrees above the horizon, making it appear to the pilot to be at roughly his own 35,000 ft. altitude. Mars, slightly lower on the horizon,

was about 20 degrees to the right of Jupiter but not as bright. . . . Although the very bright Jupiter, and less bright Mars, had to be visible to JAL Capt. Kenjyu Terauchi, the pilot never once reported seeing either—only a UFO.

Many of the colorful details of the incident carried by the news media, largely based on the six-week-old recollections of the pilot of JAL Flight 1628, are contradicted by a transcript of radio messages from the pilot to FAA controllers while the incident was in progress. For example, news media accounts quoting the 747 pilot said that when he executed a 360 degree turn, the UFO had followed him around the turn. But this claim is contrary to what the pilot told FAA controllers at the time.

ly-collimated bipolar jet." In his spare time he attended CSICOP conferences, where I met him several times, a very friendly fellow. Unfortunately, he died of a cardiac arrest a few years after this.

The FAA issued an in-depth report, with primary references and interviews included. Unfortunately, the FAA charged $194.30 for the complete package, including all written records, photographs, and all tape recordings. It wasn't exactly a bestseller, since not too many people were sufficiently interested to send in almost $200 for information about a UFO report. In fact, it sounds very much like the FAA constructed this expensive package to deter the many people

The FAA issued an in-depth report, with primary references and interviews included. Unfortunately, the FAA charged $194.30 for the complete package, including all written records, photographs, and all tape recordings. It wasn't exactly a bestseller.

An interesting historical footnote: in the press release, Klass credits "astronomers Nick Sanduleak and C. B. Stephenson, of Case Western Reserve University, in Cleveland, for their valuable assistance in computing the positions and bearings of bright celestial bodies relative to the 747 airliner at the time of the incident." In February 1987, the month after this press release was issued, southern hemisphere astronomers discovered supernova 1987a in the Large Magellanic Cloud. It was the brightest supernova seen from Earth since 1604, easily visible to the naked eye. Researchers discovered that the progenitor star (before the supernova explosion) was a blue giant star known as Sanduleak -69° 202. Yes, that Nick Sanduleak (1933–1990). He cataloged the stars of the Large Magellanic Cloud. He also discovered Sanduleak's Star, a very unusual object in the Large Magellanic Cloud, with a "giant, high-

badgering them for information on the case. But that didn't deter Philip J. Klass.

Klass wrote an article in the Skeptical Inquirer, Summer 1987: "FAA Data Sheds New Light on JAL Pilot's UFO Report." It was reprinted in the book *The UFO Invasion* (Prometheus Books, 1997). Klass wrote,

> The FAA data package reveals Terauchi to be a "UFO repeater," with two other UFO sightings prior to November 17, and two more this past January, which normally raises a "caution flag" for experienced UFO investigators. The JAL pilot is convinced that UFOs are extraterrestrial and when describing the light(s) Terauchi often used the term *spaceship* or *mothership*.
>
> During his January 2 interview with FAA officials, Terauchi said that he believed the "mothership" intentionally positioned itself in the "darkest [easterly] side" of the sky because "I think they did not want to be seen." This enabled the UFO to see the 747 "in front of the sunset and visible for any movement we make." In his report to the FAA, he expressed the hope that "we humans will meet them in the new future". . . [On January 11] he again reported spotting unusual lights in roughly the same area while on a repeat flight from Paris to Anchorage. . . .
>
> [Terauchi] always failed to mention that two other aircraft in the area that were vectored into the vicinity of the JAL 747 to try to spot the UFO he had been reporting were unable to see any such object . . . [Flight Engineer Yoshio Tsukuba] "was not sure whether the object was a UFO or not". . . . When the copilot [Takanori Tamefuji] was asked if he could distinguish these lights "as being different" from a star, he replied: "No."

Bruce Maccabee has written a very long report (as is his habit) on the JAL 1628 UFO:

> CSICOP was not finished with the case. Evidently even Phil Klass could see that his Jupiter-Mars explanation had failed. In the Summer 1987 issue of the Skeptical Inquirer he published a new analysis. [Actually, Jupiter was still part of Klass's analysis, but the fainter Mars was not.] This time the lights were explained as reflections of moonlight from the clouds and "turbulent ice crystals." (Recall that the air crew reported thin clouds below them.) According to Klass the turbulent ice crystals "could have generated flame-colored lights" and "this would also explain why the undulating lights would periodically and suddenly disappear and then reappear as cloud conditions ahead changed. When the aircraft finally outflew the ice clouds and the initial 'UFO' disappeared for good (the Captain) would search the sky for it, spot Jupiter further to the left and conclude it was the initial UFO." Klass attributed the airplane radar sighting to "an echo from thin clouds of ice crystals."
>
> Klass's explanation verges on scientific garbage. There is no reason to suppose that moonlight reflected off ice crystals in the clouds would generate "flame colored lights." Klass's explanation certainly could not account for the heat which Terauchi felt on his face. Nor would it explain the distinct arrays of flames or lights associated with two independently

> flying objects that appeared ahead of the plane and above for many minutes (the clouds were reported to be below the plane).

While I tend to agree that moonlight reflecting off clouds would probably not make a very good "UFO" display, there are so many sources for "lights in the sky" (including "lights on the ground," which Terauchi agreed with the FAA was an explanation for his January 11 UFO sighting) that once the main "UFO" has been demoted from a giant "mothership" to "unexplained lights," it no longer impresses us as much of a mystery. Even J. Allen Hynek, the late USAF Project Blue Book consultant, was dismissive of "lights in the sky" UFO reports. The bottom line is, Terauchi's own flight crew saw only "lights," and other aircraft checking out the situation saw nothing unusual.

The case merits a chapter in Leslie Kean's book, *UFOs: Generals, Pilots, and Government Officials Go on the Record* (see my review at http://debunker.com/texts/kean.htm). Written by John J. Callahan, he claims that Terauchi's crew "both saw it, too." Of course this is false—they saw only lights, not the giant spaceship that Terauchi reported. Callahan also claims that "it flew alongside his jet" after he turned, but (as Klass notes) this contradicts what Terauchi told FAA controllers at the time. Callahan ices the cake with his claim that the CIA has over thirty minutes of radar data confirming Terauchi's UFO, but they refuse to release it, to prevent public panic.

How credible is Callahan's account? In 2011, UFO Blogger Ryan Daube wrote (http://goo.gl/8A8hwq):

> At this point, Callahan's credentials and story has never actually been independently confirmed. In fact, back in 2007, as we were attempting to verify his claims, we contacted CIA Science Analyst Ron Pandolfi. Ron admitted that both he and Maccabee had in fact attended an FAA meeting like the one Callahan described. However, he did not recall anyone making any statement that the meeting never happened, or that the data should be covered up. . . . We contacted Maccabee and he also confirmed that he was at such a meeting and received all of the data for his analysis and report, but he also did not recall anyone at the meeting trying to cover it up.
>
> We reported this contradiction to Leslie Kean of the Coalition for Freedom of Information—the only listed contact for Callahan—and she initially did not believe us. Therefore, I put her in direct contact with Pandolfi and Maccabee, who both told her exactly what they told us. Kean refused to let us speak directly with Callahan to resolve the discrepancy, and eventually refused to cooperate regarding getting any clarification from Callahan.
>
> In fact, Kean completely ignored the contradictory witness statements that she received first-hand, and instead went on to publish a book in 2010 titled *UFOs: Generals, Pilots and Government Officials Go On the Record*, where she repeated Callahan's testimony in full on page 222, and even focused on the "this never happened" statement.
>
> She completely left out the fact that she had received direct testimony from both a CIA analyst and Bruce Maccabee, stating that they were at such a meeting that matched the meeting John described, and that no one said anything about covering-up.

So much for the credibility of both John Callahan and Leslie Kean.

Kean is enormously impressed by pilot sightings, which she describes as "a unique window into the unknown." She writes that pilots "represent the world's most experienced and best-trained observers of everything that flies … these unique circumstances potentially transform any jet aircraft into a specialized flying laboratory for the study of rare anomalous phenomena." Yet J. Allen Hynek—whom Kean repeatedly cites as a respected UFO authority—came to exactly the opposite conclusion. On page 271 of his 1977 book *The Hynek UFO Report*, he wrote, "Surprisingly, commercial and military pilots appear to make relatively poor witnesses." Kean actually quotes from other pages of that book but makes absolutely no mention of Hynek's low opinion of pilot sightings.

Re-reading Terauchi's own statements about the incident, I don't think that anyone could call him an unbiased or objective observer. ■

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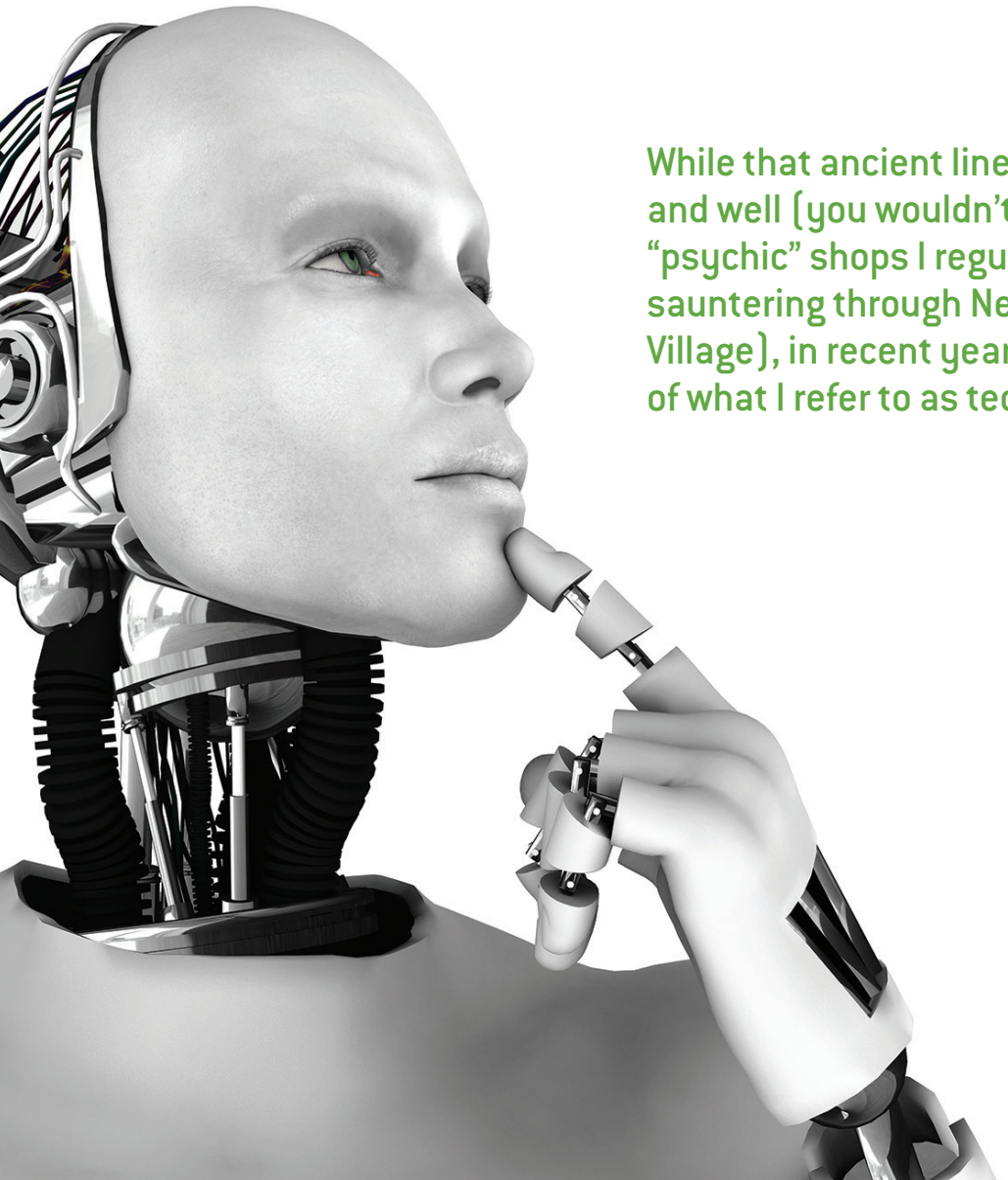
SPECIAL ISSUE
SCIENCE AND RELIGION

Massimo Pigliucci is K.D. Irani Professor of Philosophy at the City University of New York, a fellow of the American Association for the Advancement of Science, and coeditor (with Maarten Boudry) most recently of *Philosophy of Pseudoscience: Reconsidering the Demarcation Problem*. His essays can be found at ScientiaSalon.org.

Futurology

The illusion that we can predict the future has always been with us. The ancient Greeks and Romans were trying to do it by asking oracles and looking at the patterns in the entrails of disemboweled animals. At the same time, the Israelites produced copious prophecies, which they then regularly claimed—on quite shaky grounds—invariably came through. I barely need to mention Nostradamus, of course.

While that ancient line of business is still alive and well (you wouldn't believe how many "psychic" shops I regularly encounter while sauntering through New York's Greenwich Village), in recent years we have seen the rise of what I refer to as techno-utopians. I have devoted an entire column to one of the most egregious examples, Ray Kurzweil (SI November/December 2012), and a recent article in the *New Statesman* by Bryan Appleyard (April 10, 2014) has highlighted just how bizarre it is that Kurzweil has recently been hired to "work on new projects involving machine learning and language processing" by none other than Google. The basis for the hiring was Kurzweil's latest book, *How to Create a Mind*, which Appleyard reminds us has been thoroughly trashed by reviewers on the basis that Kurzweil knows, "to a rough approximation, nothing about the subject." But hey, it's Google's money, not mine.



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Another justified target of Appleyard is my own newly acquired (because I have started a new job; he was already there) colleague at the City College of

New York, physicist Michio Kaku, who in his latest book, *The Future of the Mind*, praises the Defense Advanced Research Projects Agency (DARPA) for working hard in order to "accelerate the future into being," whatever that means, and regardless of the fact that DARPA's plans are probably closer to the activities of the NSA than to anything that would truly benefit our or anyone else's democracy (though, to be fair, they were instrumental in creating the Internet).

There is an interesting contrast between the futurism of Kaku and that of Kurzweil, however. The former seems to be inordinately optimistic about whatever will come next, regarding the future as an intrinsic good. As Appleyard puts it in the context of his discussion of another debatable contemporary phenomenon, it's like TED talks and their simplistic, hyped, overly optimistic messages. Kurzweil and other believers in the rapture-for-nerds that goes under the name of Singularity, instead, think the odds are high that we will soon (it's always *soon*, though not quite soon enough) be facing a post-human (as in, after human extinction, one way or the other) world. When (not *if*!) the artificial intelligence will surpass human intelligence, we will have a choice of either succumbing to our new computer overlords or, effectively, becoming them (by "uploading" our minds into computers).

Then again, even good old fashioned prophecies weren't always positive: just think of the gloom and doom that seeps throughout Nostradamus's writings, or—even better—the book of Revelation in the New Testament. Of course, in the latter mythology the good guys get saved, just like Kurzweil and co. get to upload themselves. Maybe that's the very reason why this sort of futurology has always been fashionable: sure, it's going to get really bad, but not for a minority of elected souls, and of course we always think we will be part of that very minority.

In that respect, I am reminded of a powerful National Public Radio piece that ran a number of years ago on the subject of the Normandy invasion near the end of World War II. The reporter managed to talk to a survivor who was eighteen at the time of the events. The guy still vividly remembered the commander of his platoon addressing them on the morning of the landing, bluntly telling them that by evening nine out of ten of them would probably be dead on the beach. The survivor looked at his comrades in the room, thinking "poor bastards," assuming that *he* would, of course, be among those who would make it. Which he did, of course. But it's a good bet that *everyone else* thought something along the same lines and didn't survive to tell the story decades later.

Raymond Kurzweil at the Singularity Summit at Stanford in 2006

The sobering fact is that futurologists have an abysmal record to parade, made of many misses (which tend to be promptly forgotten), a few successes (often relatively low hanging fruits), and a number of post hoc rationalizations for why a miss should count as a success. The truly amazing thing is why so many of us keep paying attention. We just can't help it, I guess, because we long to know what's coming next, especially if it is something that can in one way or another postpone our inevitable demise. Human beings are—perhaps alone on this planet—characterized by the curse of self-awareness. We have the incredible ability to reflect on ourselves and our place in the universe, but we are also painfully aware of the fact that we exist during a brief moment between the two eternities of whatever was before we were born and whatever will be after we die. And as Woody Allen famously quipped, we don't want to be immortal through our works, we want to be immortal through not dying. Even if it is going to be as a few petabytes of information scattered inside a computer network. ■

The sobering fact is that futurologists have an abysmal record to parade, made of many misses (which tend to be promptly forgotten), a few successes (often relatively low hanging fruits), and a number of post hoc rationalizations for why a miss should count as a success.

Massimo Polidoro is an investigator of the paranormal, lecturer, and cofounder and head of CICAP, the Italian skeptics group. His website is at www.massimopolidoro.com.

The Amazing Randi's Most Extraordinary Escape

Part 1

As announced in my previous column, I will be writing James Randi's biography. We may be starting a fundraising campaign by the time you read this. You can watch on YouTube the presentation of the project I did at the recent Amazing Meeting. If you want to support the project or just receive news and updates, you can send me an email to massimopolidoro1@gmail.com and I will keep you informed. Meanwhile, here is the first part of a sample chapter from the book that I hope you will enjoy.

"Last Friday, around 4 PM, a famous individual, known all over America, and especially well known to policemen, was able to pull out a sensational escape from one of the prison cells of the Valleyfield police station."[1]

This is how *Le Progrès de Valleyfield*, of October 14, 1954, opened its story—not about the dangerous escape of a known criminal, but about one of the most extraordinarily crafted and masterfully executed jailbreaks ever concocted by a non-criminal.

The island of Salaberry-de-Valleyfield, located in southwestern Quebec, in the Regional County Municipality of Beauharnois-Salaberry, was known outside Quebec mainly for being the site of Les Régates de Valleyfield, an international hydroplane race that first started in 1938. The mid-sized town had seen little magic since then . . . and it had certainly never seen someone like Randi.

Booked to appear at the Royal Theatre on October 21 and 22, along with comedians and close friends Danny Dean and Gerry Dryer, Randi was determined to come up with something special to draw attention to the event.

"We were doing, as a matter of fact, a spook show," remembers Randi. "So we needed to get some publicity, and I thought a jailbreak would be absolutely *poifect*!"[2]

In magician's lingo, a spook show is a performance where a thriller movie is shown at midnight, and all kinds of mysterious things happen when the lights go out. The movie suddenly stops, objects start to fly, lights appear, screams fill the room, and ghostly figures float around the theater.

"It's essentially a magic show with spooky elements," Randi explains. "We used *The Bride of Frankenstein*, with Boris Karloff, and I still know every word from it, but in reverse, since I used to watch the movie from behind the screen, you see!"[3]

Dean placed a call to Police Chief Marleau, explaining what Randi wished to do in the station's prison block. At first the chief refused, but somehow (perhaps with a little help from Randi), a few reporters got wind of the idea and talked him into it.

The day was set. The Amazing Randi would try to escape from a cell of the Valleyfield Royal Canadian Mounted Police jails on Friday, October 8, 1954.

When Randi arrived, accompanied by Dean, around 4 PM, he found that *la Centrale de Police* was just a block building on two floors, isolated in a field of grass. Reporters were waiting and came out to meet them.

It began with the usual chitchat: How long have you been doing this? Are you sure you are going to get out? What would you like us to bring you for dinner in jail tonight? Hah-hah!

Then they got down to business.

"The chief chose a cell block with only one exit, a solid steel door into the room where the police and reporters were to wait" reported Richard Gehman in *True* magazine. "Randi was stripped and thoroughly examined by a city doctor who, aware of the ways of magicians, even peered at the soles of Randi's feet."[4] After locking most of Randi's clothes in a cell next to the exit, the police took him into his cell, handcuffed his ankles and hands together and to a chair, went outside, locked the steel door, and settled down to wait.[5]

Randi had arranged for the chief to call in to him every five minutes to make sure he was all right.

"Ça va?" the Canadian called. "How does it go there?"

"Ça va bien!" Randi's muffled voice came back.

Five minutes later they called again and got the same answer.

At the third call, no response came back. Just then an automobile horn began honking in the street. Thinking that the noise had drowned out Randi's voice, the chief called again.

"Ça va bien? Monsieur Randi?"

Still no answer.

And this is how *True* magazine concluded its sensational report:

> They unlocked the steel door and burst into the cell block. It was pitch dark. The police snapped on hand torches and stumbled down the corridor to the cell where they'd left Randi. The chair, all handcuffs still locked in place, was leaning against a wall—empty. The cell door was locked. Astounded, the cops rushed back up the corridor to the cell where they'd left Randi's clothes. It, too, was locked—and empty.
>
> Someone then realized that the automobile horn in the street was still honking insistently. As one man, police and reporters rushed to the barred windows. Randi was sitting behind the wheel of a car, unconcernedly reading a magazine and blasting away at the horn.

The police must have thought Randi was a ghost. *The horn was already beeping before the police had entered the jail block, through the only possible exit that Randi could have taken to get out!*

"It caused a bit of a stir. If I do say so myself (and I do)."[6]

What Randi did was, in a word, impossible. Like Eliot's Magical Mr. Mistoffelees, he had "crept through the tiniest crack" and seemingly transported himself from his locked cell to the car, right under the eyes of the police. But how?

"First of all, in doing my jailbreaks all over Quebec and Ontario, which is where I did most of them at the time, I always prepared myself months in advance. And the way I did it, was, every time I passed through a town I would always stop in at the local police department at about two o'clock in the morning."[7]

At such a time there would probably be only a constable on duty and maybe one patrol car outside, with the driver inside dozing or whatever. "You know these towns, there's not very much going on, and the guy behind the desk would be bored and maybe nodding off himself. So I'd walk in with a roadmap in my hand, go over to the desk and say: 'Hi! I'm just goin' through town here, and I'm heading for so-and-so and it seems a little confusing here. . . .' I'd have him explain something on the map. And while he did that I would thank him very much for his help, and look around and say: 'Wow! This building . . . how long has this been here, do you know?' And, he'd usually tell me: 'Oh! It's been here a good thirty-five years!' or 'It used to be the City Hall . . .' or whatever. And, I'd say 'You know . . . I study locks, old antique locks and such, I use 'em in my profession as a matter of fact, and I wonder if . . . would you mind showing me the jail cells here? What kind of lock do you use, a Froggatt lock or is it a Folger-Adam?'"[8]

The police must have thought Randi was a ghost. *The horn was already beeping before the police had entered the jail block, through the only possible exit that Randi could have taken to get out!*

This was all it took. Those "magic" words would let the constable know that the visitor really knew something about jail locks and, since it was so late and nothing much was happening, why not give the stranger a tour of the block?

"He'd usually show me the cells, and I'd say: 'Oh! This is the Folger-Adam! The one that uses the big, big flat brass key!' And he'd say, 'Yeah, yeah, yeah!' And he'd go into the drawer, or to his belt or wherever he had to go, and bring out the key. Now, this was a good opportunity to employ the ball of clay that I had in my hand, by a strange and somewhat contrived coincidence, as Jay Marshall would say."[9]

And this is precisely what took place with the Valleyfield escape.

"I happened to have done that two years previously in Valleyfield. The original key was about 5" long, 1.5" wide, heavy brass. The duplicate I made was much smaller, of course. And so I decided: 'OK, I have it for Valleyfield,' so I'm all set for that, because otherwise the Folger-Adam locks would take a lot of work and specialized tools, and it's very difficult to get in there with them."[10]

But how did Randi exactly escape not only from the cell that kept him a prisoner but from the police building altogether? This is a mystery, dear readers, we will unravel in the next issue. ■

Acknowledgments

Thanks to Rob and Eileen Evon for their kind assistance.

Notes

1. "Evasion sensationelle à la station de police de Valleyfield," *Le progres de Valleyfield*, Oct. 14, 1954.
2. Interview with Penn Jillette and Kim Scheinberg, March 11, 2005.
3. Interview with Kim Scheinberg and Angus Johnston, February 28, 2010.
4. Richard Gehman, "How to get out of anything," *True* Magazine, July 1956.
5. Ibid.
6. From a letter to P. Howard Lyons dated October 10, 1954.
7. Interview with Penn Jillette et al.
8. Ibid.
9. Ibid.
10. Interview with Massimo Polidoro, June 24, 2014, plus Penn Jillette et al.

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of seven books, including *Mysterious New Mexico: Miracles, Magic, and Monsters in the Land of Enchantment*.

Vegetable Oil or Snake Oil? The Pseudoscience of 'Oil Pulling'

Q: I recently heard about something called "oil pulling," where you swish oil in your mouth and it's supposed to be good for you. Is there any truth to it?

—S. Pedroncelli

A: The latest health fad making the rounds is something called "oil pulling," an ancient Indian practice in which people cleanse their mouths (and bodies) of toxins by swishing a vegetable oil (such as olive, coconut, or sunflower) in their mouths for twenty minutes and then spitting it out.

It's ridiculously simple, and it is claimed to be amazingly effective. According to a blog for the *Skeptoid* podcast, "Oil pulling is said to treat chronic pain, insomnia, cavities, allergies, thrombosis, diabetes, asthma, bad breath, gingivitis, digestive issues, meningitis, low energy, heart disease, kidney disease, 'toxic bodily waste,' PMS, leukemia and even AIDS. Oil pulling, it would seem, is truly a life-changing medical miracle" (Rothschild 2013).

Okay, so maybe swishing a few teaspoons of olive oil isn't a "life-changing medical miracle." Other claims are more down-to-earth; according to one popular alternative medicine writer, "Oil pulling is an age-old remedy that uses natural substances to clean and detoxify teeth and gums. It has the added effect of whitening teeth naturally and evidence even shows that it is beneficial in improving gums and removing harmful bacteria. The basic idea is that oil is swished in the mouth for a short time each day and that this action helps improve oral health. . . . The practice of oil pulling started in India thousands of years ago" ("Katie" 2013).

The fact that oil pulling has been used for thousands of years (if indeed it has) is asserted as proof of its efficacy, but it means nothing. This is an example of a logical fallacy called the "appeal to tradition." Just because a practice has endured for hundreds or thousands of years does not mean it is valid. For nearly 2,000 years, for example, physicians practiced bloodletting, believing that balancing nonexistent bodily humors would restore health to sick patients. The fact that the premise was completely false and absurd made no difference: the patients who died were assumed to have been too sick (rather than killed by the bogus medical treatment), and the ones who recovered (despite, not because of, the bloodletting) were convinced the treatment was a miracle cure. It's the same reason that people believe superstitions; carrying a four-leaf clover or a rabbit's foot doesn't actually bring good luck, but people do it anyway. So the fact that oil pulling has been used for years doesn't mean anything. Still, proponents claim, oil pulling can help leach out toxins from the body through the mouth. When you spit the oil out, your body's toxins go with it. That must be good and important, right?

Well, not so fast. Vegetable oil is not needed to "detoxify teeth and gums" for the simple reason that teeth and gums are not toxic in the first place. Claims of "detoxification" and "cleansing" have been important (and lucrative) for the New Age and alternative medicine industries. The world is full of dangerous toxins, they claim, and in order to get healthy you need to periodically remove impurities from your body. As I discussed in my previous columns on Kinoki Foot Pads ("Kinoki Drains Wallets, Not Toxins" in the November/December 2011 SI) and sweating ("Sweating the Small Stuff," in the May/June 2010 SI), the fact is that the human body does a pretty good job of eliminating toxins on its own, using all-natural organs like the liver and kidneys. Virtually all products claiming to cleanse and detoxify the body are worthless and unnecessary.

So what does oil pulling actually do? Probably nothing. Only a handful of medical studies have been done on the benefits of oil pulling; all of them are from India and none of them seem to show a consistent benefit for any particular condition. (Rothschild notes that "Some [studies] indicate mild improvement in gum health, comparable to mouthwash use. But they're not well blinded, use very small sample sizes and involve oil pulling only as part of a proper oral hygiene regimen. So it's impossible to tell what's causing said improvement.")

Aside from that, as is often the case with pseudoscientific theories and claims, including dowsing, homeopathy, and astrology, there seems to be no consensus on how exactly it works, what exactly its benefits are, or even how it's supposed to be done. Some say it only works with a particular type of plant oil (olive and sesame seem especially popular); others say it doesn't matter as long as you swish your mouth for the full twenty minutes. Others claim they get great health benefits from swishing for half that time, or even a minute or two. It seems to work if you think it will work, which is of course a hallmark of the placebo effect.

There's nothing wrong with gargling or swishing your mouth out with natural oils (diluted peppermint oil, for example, is a natural antiseptic that will leave your breath nice and fresh). But there's nothing unique or particularly healthy about swishing oils in your mouth. ■

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From Our Archives

Find this related Skeptical Inquirer article at www.csicop.org.

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Our special issue on science and religion (July/August 2014) generated a heavy response. Most letters commented on the cover article, "Would the World Be Better Off Without Religion?" Here we present a selection; the authors then respond. The other hot-flash topic in the issue was the "Science of Medicine" column on genetically modified organisms. A selection of those letters, and the author's response, follows those about the science and religion section. —Editor

Would We Be Better Without Religion?

"Would the World Be Better Off Without Religion?" by Scott O. Lilienfeld and Rachel Ammirati (July/August 2014) was definitely a cut above the usual article on such a topic since it dared to rise above intellectual tribal politics and instead advocated caution when entertaining such a complex question. May I make a helpful suggestion and propose that the focus be not on the presence or absence of a specific doctrine but rather on that of a particular pathological state of mind.

The pathology I have in mind is what could be sheltered under terms like "religiosity" and "fanaticism," in the spirit of that Yippie saying "Ideology is a brain disease." A powerful overwhelming certainty that trumps decency and common sense can be spawned in any swamp, be it holy or profane. One can counter the examples of wacko fundamentalist Islam and Aztec blood religion with exhibits like Pol Pot and Stalin. An atheist would have to admit that he would much rather live under a placid Jain than the ruthless Mao. Focus on and identify a dangerous state of mind rather than the particular cloak it wears that particular day. Rampaging nuttiness is a cross dresser.

J. Wroblewski
Vancouver, British Columbia, Canada

I agree with the authors of this article that the social science data they selected to evaluate do not provide convincing evidence on one side or another. However, I don't understand why they ignored the best data that are available, namely the surveys of the social health in nations with varying levels of religiosity.

In 2005, freelance researcher Gregory S. Paul published the results of surveys that correlate religiosity in various first-world nations with social health. He concluded that "in almost all regards the highly secular democracies consistently enjoy low rates of social dysfunction, while pro-religious and antievolution America performs poorly." Similar results are reported by sociologists Pippa Norris and Ronald Ingelhart in their 2011 book *Sacred and Secular* and by sociologist Phil Zuckerman in his 2009 book *Society without God*. The facts are clear and simple: many people are happier, behave well—even better—without belief in God and there is no reason to think the rest of humanity will never come around and finally discard supernatural fantasies.

Victor J. Stenger, PhD
Emeritus Professor of Physics, University of Hawaii
Adjunct Professor of Philosophy, University of Colorado
Lafayette, Colorado

(Stenger, author of God: The Failed Hypothesis *[2007] and other related books, died August 27, 2014. See p. 9.)*

I applaud the tone and evidence-based balance Lilienfeld and Ammirati took in "Would the World Be Better Off Without Religion?" I am agnostic (lacking sufficient hubris to be atheistic). Nonetheless, I admit to my own ambivalence on the article's question. It appears to me a majority of people are more comfortable as followers than as independent thinkers. This pattern is commonplace in the animal kingdom.

We know that certain proclivities, such as a talent for art, math, and musicality, as well as sexual orientation, are biologically innate, not totally acquired. It may be that even skepticism has a biological component. If so, we lucky few should be less self-congratulatory about our vaunted independent thinking, as it may be as much happenstance as learned.

I imagine most nonbelievers, as I, live in a world where many family members, friends, and coworkers are religious to one degree or another. I have served on numerous faith-based charitable events where I enjoyed the enthusiasm and sincere motives of the volunteers. I avoid religious fundamentalist hate-mongers, so I rarely feel ill at ease among believers I socialize with. I'm sure Richard Dawkins would consider me a hypocrite, if not downright traitorous. But my friends and family are more open to my views on the validity of science and the unlikelihood of supernatural explanations than they would be if I were arrogant and condescending.

John Clinger
Midlothian, Virginia

I enjoyed "Would the World Be Better Off Without Religion," but I have a small quibble. The authors commit a moderate error on p. 31 in setting up their construction of "tangible questions." They begin by claiming to "operationalize this propensity roughly in terms of lower rates of aggression and higher rates of altruism." In the very next sentence, they then narrow their concept of "aggression" substantially by limiting it to "levels of criminal and antisocial behavior, including violence."

The idea of aggression, especially as related to religion within a societal context, cannot be limited to these three rather vague subjects. One matter the authors leave out by their subject-narrowing is the societal effect of religious persons/leaders imposing their own views upon others who may not share those views. This is an almost universal aspect of religion. (Where the religious are able to impose their rules upon society, they usually insist on doing so.)

To those who are thereby forced to adopt behaviors, rules, or lifestyles contrary to those they would have self-selected, it certainly has an aggression component. Any time somebody says "thou shalt," it necessarily limits the freedom of choice of those who are somehow subordinate. Because the mandate is religiously based, it is formulated without the checks and balances of reasoned forethought and skeptical restraint. What results is most often arbitrary, and to some degree unsupportable by reason. Those subjected to arbitrary, unreasonable dicta often feel that the only way to escape from such

authority is by rebellion, which often takes violent form. The authoritative response to rebellion (even peaceful rebellion) is very often violent as well. For these reasons, the very act of imposing religious standards upon "others" within a society is in and of itself an aggressive action.

Paul Schleuter III
Dallas, Pennsylvania

I enjoyed the article and was impressed by the scholarship and objectivity but found it flawed. The authors have tried to make a case for the assertion that religions, on average, make the world slightly better, but not by very much. They cite numerous studies whose results are mixed but supportive of that view.

I don't buy it. They're trying too hard to be fair, weakening the skeptics' case. They quote Dawkins's recounting of numerous atrocities committed in the name of religion—but follow that with a counter list of evils perpetrated by people not motivated by religion. So what? If a religious crime (the Inquisition, 9/11 attacks, etc.) is bad, it does not become *less* bad just because Stalin also killed multitudes.

My other objection points to a deeper flaw. The authors seem to ignore the rampant cherry picking on the part of the studies they report. Sure, there are communities of civilized folks of various religions, and in response to questionnaires they don't seem too radical or evil. So what? In all those studies, how many members of Al Qaeda were questioned? How about Boko Haram? Al Shebab? If you deliberately leave out the people who are motivated by religion to do harm, do the benign results from the ones questioned really mean anything? I doubt it.

Objectivity is great, but one must look at the larger picture and consider all the facts.

Don Dilworth
East Boothbay, Maine

Lilienfeld and Ammirati's article on a world with or without religion points to some important research on the subject. However, overall the studies they survey do not really illuminate the debate whether the world would be better off without religion for two major reasons:

First, all of the studies involve personal morality, but none of them disentangle the teaching of values from the magical thinking that goes along with religion. Intuitively, it's easy to imagine that values taught early and repeatedly, then reinforced by family and community, will be internalized. Because religion has been so institutionalized across society, and for much of history, it has been a primary teacher, arbiter, and enforcer of morality. Societies have not developed equivalent secular institutions that could be used for a comparison.

Second, when I consider the question in the article, it is really institutionalized, ideologically driven violence that is at the heart of the issue. None of the research in the article deals with this question. What is needed then are thorough surveys of violence, both individual and large scale, that is ideologically motivated. For a detailed look into that issue I recommend Steven Pinker's *The Better Angels of Our Nature: Why Violence Has Declined.*

Religion clearly has much that is positive for society. Whether those benefits could be achieved without the negatives, which seem to derive from the certainty of delivered truth and the fairy tales that must be told to support that notion, is a much more complicated conundrum. The authors are entirely correct when they say the question may be impossible to answer.

Brad Goldberg
Studio City, California

If the article were called "Would the World Be Less Violent without Religion?" the article might have some validity. Possibly that question is open for debate. But the data presented in the article are not relevant or important when it comes to determining whether religion is a positive or negative influence in the world.

Most people are not killed or harmed by violence. Throughout time, and especially now, people suffer early deaths due to disease, malnutrition, and accidents. You can get a list of deaths broken down by causes on Wikipedia. You will find that deaths due to war are 0.3 percent.

To get a perspective on the role of religion in affecting the prevention and treatment of disease, and promoting nutrition, change the title to this: "Would the World Have Been Better Off Without 550 Years of the Suppression of Science, Medicine, and Technology from 450 to 1000 AD," and you'll have your answer without having to do any further scientific study. Imagine what the world might be like 550 years from now, and that's what you'd have today without the Dark Ages caused by religion.

Bob Felten
Los Gatos, California

I have some issues with the article.

First, the second quote from Daniel Dennett's book *Breaking the Spell* (his "quip") is inaccurate. The actual wording was "so many religious organizations are eager to confirm their traditional beliefs about this scientifically. (They are quite impressed with the truth-finding power of science when it supports what they already believe). Every month that passes without such a demonstration underlines the suspicion that it just isn't so."

Second, I question the validity of the "historical counterexamples" cited to demonstrate "heinous nonreligious violence on a grand scale" by "secular anti-religious regimes." The regimes cited were those of psychotic dictators with their own personal goals. I doubt that they were champions of secularism, or that they would not have embraced religion if it suited them.

Finally, there is the mention of the obedience studies of Stanley Milgram. I remember reading about these studies, and I think the results do not support the idea that experimenters who "carried the banner of the authority of science" would be as successful in inciting people to gleefully burn witches, hang heretics, and massacre unbelievers as the religious establishment has been. The experimenters would also find it difficult to institutionalize these actions as well as anti-Semitism was by Christianity.

Otherwise, the article was fascinating.

Kimball M. Rudeen
Tyngsboro, Massachusetts

Richard Dawkins, as a scientist proposing a hypothesis or arguing for a theory, is properly expected to pay attention to opposing views. As an angry person expressing a grievance, he should not be judged by the same criteria, even when he uses language with the same skill.

The root of his fury against religion is described at the start of his 1992 Voltaire lecture, "Viruses of the Mind" (reproduced in the collection *A Devil's Chaplain,* 2003). He speaks of his daughter, then aged six, who, with her school friends, "believe[s] the solemn word of respected adults that both fairies and Father Christmas really exist."

"I have just discovered that without her father's consent this

sweet, trusting, gullible six-year-old is being sent, for weekly instruction, to a Roman Catholic nun. What chance has she?"

Donald Rooum
London, England

How many people have to die in the name of religion before it is dismissed like any other danger? When was the last time something was understood through belief?

What the article misses and believers fail to see is that religion as we practice it is already a form of violence. Think of coercion, brainwashing of young minds, and threatening children with violence and damnation in their formative years, scarring them for life. In any other circumstances this would be considered criminal. We as a society are stagnated, mired in conflict. As I write, people are dying. We debate our beliefs as if they could somehow be proven. The real problem is none of this denotes intelligence.

Bill Rogan
Acworth, New Hampshire

To me, the question of whether religion is good for society is irrelevant. The real questions are things like "Are people immortal?" "Do heaven and hell exist?" and "Was Earth created in seven days by a supernatural being?" If your answer is yes to these questions, you are wrong, and you are on a slippery slope that can lead to thinking that teaching lies in schools and killing nonbelievers are virtuous activities.

In sum, truth matters.

Peter Williams
Monterey, California

Lilienfeld and Ammirati respond:

In our article, "Would the World be Better Off With Religion?," we surveyed research bearing on the oft-discussed question of whether religion is associated with higher levels of antisocial (e.g., aggressive, criminal) behavior and lower levels of prosocial behavior. We concluded that extant data do not permit a clear-cut answer to this question, and that definitive pronouncements by either fervent atheists or fervent religious apologists are unwarranted. In essence, we argued that all participants in this debate must adhere to Carnap's (1947) "principle of total evidence"—one must attend to all data, not merely data that are congenial to one's position. The primary goal of our article was to stimulate thoughtful discussion regarding an important issue relevant to the readership of Skeptical Inquirer. *The comments we received, both supportive and critical, were heartening, as they suggest that we were at least partially successful. We are grateful for the opportunity to respond to some of the issues raised in these interesting letters, and we thank the writers for their contributions. To our eyes, the comments fall into four broad categories.*

First, some writers took us to task for neglecting relevant evidence. Stenger expressed surprise that we did not cite the study by Paul (2005), which revealed that secular societies are marked by higher levels of social health than are religious societies. Although this investigation may inform the broader debate, it is subject to the same inferential limitations as many of the studies we reviewed, including the use of correlational data without controls for potential third variables and susceptibility to ecological fallacies. Indeed, as Moreno-Riano, Smith, and Mach (2006) observed, Paul's findings are open to rival explanations, including unmeasured confounds (e.g., differential political freedom across countries), and cannot be used to infer causality. Felton contends that we overlooked historical evidence regarding religion's suppression of advances in medicine and nutrition. Although one can readily generate striking historical examples of how extremist religious views have impeded physical health (the tragic 1991 Philadelphia measles outbreak comes to mind), we are not aware of systematic evidence that religion per se is antithetical to the proper practice of medicine, let alone to medical progress. Moreover, the rates of religious belief among physicians are about as high as they are in the general population (Curlin, Lantos, Roach, Sellergren, and Chin 2005), suggesting that such belief does not necessarily dissuade individuals from obtaining advanced medical training.

Second, in a related vein, some writers, such as Schleuter and Rogan, took issue with our operationalization of antisocial behavior, in most cases maintaining that religion per se constitutes a form of aggression. Nevertheless, this line of reasoning renders the answer to the question we posed tautological: Religion is associated with higher levels of aggression because it is itself aggressive. To avoid that tautology, we examined studies in which aggression and antisocial behavior were measured using standardized indices. Both Goldberg and Williams contend that the central question we posed is uninteresting or at best narrow, and that the more relevant question is whether religion promotes scientific rather than magical thinking regarding the natural world. As we noted toward the conclusion of our article, we have some sympathy with this argument, but it addresses a substantially different question than the one we posed.

Third, some writers, such as Dilworth and Rudeen (whom we thank for pointing out the missing words in the second Dennett quotation), accused us and others of cherry-picking in various ways. Dilworth suggested that the studies we reviewed were biased because they did not include members of more "radical or evil" religious groups, such as Al Qaeda or Al Shebab. Nevertheless, the fact that these groups are rightly regarded as extremist encapsulates why it would be inappropriate to focus heavily on them—they are outliers. This is why we resorted to reviewing controlled studies, which are far less vulnerable to the cherry-picking of extreme cases. Similarly, both Dilworth and Rudeen took issue with our invocation of genocidal secular regimes, such as those of Stalin, Mao, and Pol Pot, as running counter to the view that religious regimes are especially dangerous. We fear that these writers may have misunderstood the point of this exercise. Whether or not these regimes killed people in the "name" of atheism is irrelevant to the question we addressed—they still killed people. Further, we did not, as Dilworth suggested, contend that the heinousness of religious crimes is diminished when terrible secular crimes are also recognized. We presented our "cherry-picked" examples to make the point that it is all too easy to point to isolated instances of great harms perpetrated in the name of religion, such as the Crusades and the 9/11 terrorist attacks, as one can just as readily point to equally compelling counterexamples of great harms perpetrated by secular regimes.

Fourth, Rooum suggested that we should hold Richard Dawkins to different standards when he is railing against religion as opposed to proposing a scientific hypothesis. The implication is that, "as an angry person expressing a grievance," Dawkins cannot be expected to adhere to rigorous criteria for scientific thinking. Our view differs for two reasons. First, in his book, The God Delusion, *Dawkins (2006) clearly invoked scientific evidence to question both the existence of God and the merits of religion for society. Second, Rooum's reasoning could just as readily be invoked to excuse individuals who are advocating for scientifically unsupported positions, such as a causal link between vaccines and autism, on the grounds that these positions are often driven by powerful emotions.*

We are inclined to agree with writers Clinger and Wroblewski that the central threat may not be religion per se but rather any well-organized ideology, secular

or nonsecular, that predisposes to fanaticism, especially fanaticism that regards all nonadherents as deeply evil. Indeed, we made precisely this point in a previous article (Lilienfeld, Ammirati, and Landfield 2009). Hence, continued debate concerning the question we posed must make concerted efforts to distinguish extremist religious ideology from extremist ideology in general.

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Faith Healing and Children

I am a fairly new subscriber and greatly enjoy each issue. I am very pleased with your July/August issue on science and religion. I am a firm nonbeliever. In regard to the topic of faith healing ("Religious Freedom vs. Child Protection"), it saddens me to learn of the massive numbers of children suffering. I knew people were out there who believe such nonsense but not to that extent. In my opinion, as with many important choices, a minor is not able to make an informed decision for themselves and it's left to the parent/guardian to make the choice for them. However, in the important choice of faith/religion I feel that it is solely the choice of the individual, and until they can make that choice they should remain unaffiliated with any belief. Thus the state is warranted to implement proper medical care in any situation and if the parent-guardian refuses, they are responsible legally for any neglect or abuse per state/federal law.

George Eberle
Bellenfonte, Pennsylvania

GMOs and Health

Steven Novella, MD, has highlighted a valid point within the confines of his area of expertise ("No Health Risks from GMOs," July/August 2014). Unfortunately, the issue he so eloquently addressed has very little to do with the real threat of GMOs.

Our Family Farms Coalition and GMO Free Jackson County supported a successful campaign to pass Measure 15-119: A Jackson County (Oregon) Genetically Modified Organism Ban on the May 20, 2014, election ballot.

The Our Family Farms Coalition emphasized the following with respect to GMOs:

1) There's no practical way to stop genetically engineered pollen and seed from trespassing onto traditional farms that have been here for years.
2) Genetically engineered crops have led to an increase in overall pesticide use. This increased pesticide use has also led to the evolution of high-impact Superweeds. The measure will help prevent Superweeds from becoming a major problem in the Rogue Valley.
3) (this measure addresses the use of) patent lawsuits by Monsanto and the other chemical corporations. These corporations have threatened many innocent farmers with patent infringement lawsuits after their patented pollen or seed has trespassed onto family farmers' property.

The obvious environmental, economic, and legal objections are real and controlling with respect to this issue.

Robert I. Price
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University of Nebraska at Kearney
Kearney, Nebraska

Dr. Steven Novella admonishes us not to treat all GMOs as equal, but then makes that very mistake himself by arguing that since GMOs old enough to have been researched have not been shown to be unsafe, all newer and future GMOs will be safe. (And since when is it acceptable to test new technologies on the public until they're shown to be unsafe?)

Novella indulges in the straw man fallacy when he argues that eating a fish gene is harmless when it comes from a fish, so it's equally harmless if it comes from a tomato. It's not the gene itself but its product and all the products of interactions of that product with the other molecules in the tomato. Biochemistry is extremely complex. We do not yet have the understanding necessary to predict all the chemical consequences of introducing new molecules into living cells.

When he claims that genetic engineering is equivalent to conventional breeding, Dr. Novella ignores two things: the pace of change and transgenic GMOs. The human species has some chance of adapting to changes in its food that take place over millennia. Sudden, drastic changes pose a clear risk. And it is not possible to breed a tomato with a fish.

The issue with GMO labeling is not whether GMOs are safe but rather who should decide. With such things as fire codes and vaccines, the government has the justification of public safety to force decisions on the individual. What is the justification for stopping consumers from being able to choose not to eat GMOs? The expansion of corporate profits does not qualify.

R. Allen Gilliam
Longwood, Florida

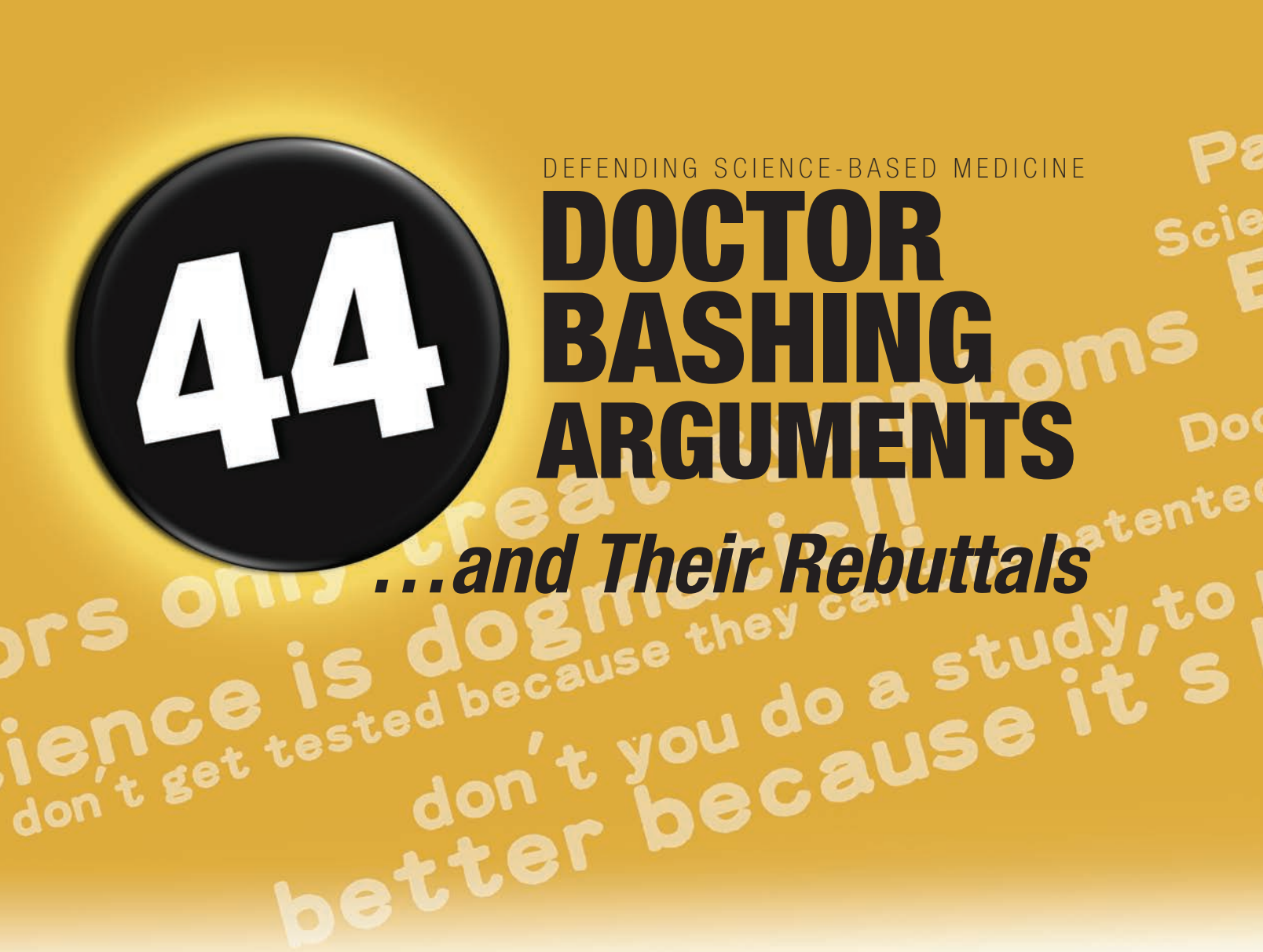
Steven Novella's column left me with several questions. The health issue is just one facet of the controversy, as hinted at in the article. Another question of perhaps equal importance is, "Why are the genetic modifications being made?" Is it to make the crops less appetizing to bugs and/or bacterial and viral attack? Is it to make them impervious to insecticides and herbicides manufactured by the same companies that perform the genetic modifications? Is it so the companies can patent their modified seeds and harass farmers who grow unmodified crops?

Some reasons I may have for not buying GMO foods might not be directly related to their genetic composition. I don't feel comfortable consuming foods that may have absorbed high concentrations of pest-controlling chemicals. I'm also unsympathetic to bullying tactics of corporations, even when I'm not directly the victim.

Wayne Orlicki
Murrieta, California

Dr. Novella's generally excellent article should be titled "No *Human* Health Risks from GMOs." There is an enormous impact on a treasured creature: Monarch butterflies. As a kid, I saw them everywhere, not now. This is attributed by scientists to an unintended consequence from widespread use of Roundup (glyphosate), to which key GMO crops are resistant but not milkweed. This non-Roundup-resistant "weed" is the sole food source for monarch butterfly larvae. Milkweed

(Continued on page 64)



DEFENDING SCIENCE-BASED MEDICINE

44 DOCTOR BASHING ARGUMENTS

...and Their Rebuttals

Supporters of alternative medicine and purveyors of quack remedies love to criticize conventional medicine and science. They keep repeating the same tired arguments that are easily rebutted. This handy guide will help skeptics answer common criticisms from doctor-bashers.

HARRIET HALL

Doctor-bashing is a popular sport practiced by believers in complementary and alternative medicine (CAM) and purveyors of quack remedies. Since they can't compete in the arena of science, their only recourse is to criticize science-based medicine—as if pointing out its imperfections somehow proves their own methods are superior! It's like creationists who imagine that controversies about small details of evolution somehow prove that "God did it."

The sport of doctor-bashing involves A LOT OF CAPITALS, miz-speld wurds, egregious errors of grammar and usage, abuse of logic, misrepresenting the facts, rejecting the scientific method, gratuitously insulting individuals rather than grappling with the issues, and so on. If players can find a way to compare doctors to Nazis, they get extra points. They tediously repeat the same false accusations and flawed arguments that have been rebutted ad nauseam.

I thought skeptics might find it useful to have a list of some common CAM arguments along with their rebuttals. These are not meant as debating points, since trying to debate true believers is as useless and frustrating as trying to glue ice cubes to the ceiling. But these points might be useful in discussing the issues with people who have not yet donned the jersey of a doctor-bashing team.

1. Science doesn't know everything.

Comedian Dara Ó Briain said it best: "Science knows it doesn't know everything, otherwise, it'd stop. But just because science doesn't know everything doesn't mean you can fill in the gaps with whatever fairy tale most appeals to you."

2. There are other ways of knowing.

Sure there are: intuition, imagination, dreams, revelation, tradition, speculation, the "stoned thinking" favored by integrative medicine guru Andrew Weil, anecdotes, and personal observations. All of these can lead people to strong beliefs, to the illusion of knowledge; but until those beliefs are tested, we can't trust them to reflect reality. Only the scientific method can lead to the kind of reliable knowledge that took humans to the moon and transformed AIDS from a death sentence into a chronic disease with near-normal life expectancy.

3. Science is only a belief system, just another religion.

Science is founded on only two underlying premises: that there is a material world, and that we can learn about how that world works. Science doesn't "believe" anything; it asks and verifies. It has an excellent track record of practical success. The scientific method unquestionably works.

4. Science keeps changing its mind.

Yes, and that's a good thing. Scientific conclusions are always provisional. Scientists follow the evidence wherever it leads, and they often have to change course as new evidence becomes available. CAM refuses to change its mind even in the face of clear evidence. Scientific medicine stops using treatments if they are proven not to work; medical history is littered with discarded theories and practices. CAM never rejects any treatment and hardly ever tests one of its treatments against another to see which is superior.

5. Science is dogmatic.

Yes, they inconsistently argue that science is dogmatic while also arguing that science keeps changing its mind. Dogmatism is found in CAM, not in science.

6. You are just robotically supporting the official party line of mainstream medicine.

When a body of experts evaluates all the published research and issues evidence-based guidelines, it's worth listening to what they have to say and trying to understand why they say it. Evidence-based guidelines are general guidelines, not cookbooks: doctors are meant to use judgment in applying them to individual patients. There is a difference between the appeal to authority ("He's a professor at Harvard, so we should believe everything he says") and accepting the consensus of experts who know more about the field than we do. If ten top mechanics agree that your carburetor needs replacing, it is reasonable to replace the carburetor. It is not reasonable to listen to your barber if he says you can fix the carburetor by sprinkling lemon juice on it. All too often, CAM advocates are the ones who are parroting unreliable "authorities" who don't know what they're talking about.

7. Doctors are afraid the AMA will take away their licenses if they support unapproved treatments.

This one is really silly, since the AMA has no regulatory authority and the majority of doctors don't even belong to the AMA. Only state licensing boards can take

away a medical license, and they seldom do that even when a doctor is using irrational treatments or outright quackery.

8. You skeptics are biased against CAM.

We are biased . . . in favor of science and reason. We are biased against claims that have been tested and disproven and that are incompatible with the rest of scientific knowledge. We are biased against health care providers telling patients things that are not true, presenting opinions as if they were facts. We are biased against using placebos because that constitutes lying, and lying is unethical. We are not biased against any

CAM treatment just because it is CAM; we contend that there is only one medicine, that treatments have either been proven to work or they haven't, and that all claims should be held to the same standard and tested by the same scientific methods.

9. Big Pharma is paying you to promote their products and discredit CAM. (The Pharma Shill gambit)

That accusation is unfounded. I don't know of a single critic of CAM who is being paid by pharmaceutical companies for anything. We don't accept gifts from drug companies. We don't get kickbacks for prescribing certain drugs. We have no incentive to favor drugs over other treatments. For that matter, subsidiaries of pharmaceutical companies manufacture many of the diet supplements on the market, so we might just as well accuse you of being paid by Big Pharma to promote its products. What about Big Supplement?

10. Doctors are afraid of the competition.

Most doctors already have all the patients they can handle. CAM has only a very small share of the healthcare market. It's not that doctors are afraid of competition, it's that they are concerned for their patients' welfare and don't like to see them lied to, given ineffective treatments, persuaded to reject effective treatments, and persuaded to risk their health and their money.

11. Doctors only treat symptoms, not the underlying cause of disease.

Don't be silly! Doctors treat the underlying cause whenever possible. If a patient has pneumonia, they don't just treat the fever, pain, and cough; they figure out which microbe is responsible and provide the appropriate antibiotic. If a broken bone is painful, they don't just treat the pain, they immobilize the fracture or insert a pin so it can heal. If a patient is in agony from pain in the right lower quadrant of the abdomen, they don't just treat the pain, they try to figure out if the underlying cause is appendicitis, and if it is, they operate.

The very people who accuse doctors of not treating "the underlying cause" are often the ones who think all disease is due to one bogus underlying cause (subluxations, disturbances of qi, poor diet, etc.). I once Googled for "the one true cause of all disease" and found sixty-three of them. (See SI 34(1), January/February 2010, available online at http://www.csicop.org/si/show/one_true_cause_of_all_disease/.) They also tend to use a single treatment (when all you have is a hammer, everything looks like a nail).

12. Science-based medicine can't explain why some people get a disease and others don't, or why people get sick at a particular point in time.

Neither can CAM. But doctors do have some pretty good ideas why it happens: exposure to infections, number of organisms that get into the body, genetic factors, toxins, immune deficiency, chance, and so on. CAM proponents claim to fully understand why it happens, attributing it to some single cause that impairs optimum health (like a subluxation or a disturbance in qi or improper diet). But they have not been able to show they understand the answer to that question any better than conventional medicine does, or that their understanding leads to better patient outcomes.

13. Conventional medicine kills patients. (The "Death by Medicine" gambit)

Critics gleefully cite statistics for drug reactions, medical errors, and iatrogenic deaths; their numbers are usually wrong, but even when they are correct, it is irrational to look at those numbers in isolation. Harms must be weighed against benefits. Medicine saves far more people than it kills. Many of those who develop treatment complications would have died even sooner without treatment. All effective treatments have side effects. Doctors look at the risk/benefit ratios and reject treatments where the risk is greater than the potential benefit. The risk/benefit ratio of CAM should be compared to that of conventional medicine; if there is no benefit, no degree of risk can be justified. There is no evidence that CAM saves lives, and it can kill if it is used in lieu of effective lifesaving treatments.

14. Doctors are only out to make money.

Most doctors go into medicine not because they want to get rich but because they want to help people. There are much better ways to get rich. Medical education is long (eleven or more years after high school), grueling, and expensive. Doctors typically work long hours and are on call for emergencies. They incur substantial debts for their education and need years to repay them. The nice houses and cars don't come until long after graduation, and few doctors make really big bucks. A much easier way to make money is to market bogus remedies or spread misinformation (like Dr. Oz, Andrew Weil, Burzynski, Daniel Amen, Kevin Trudeau, and all the companies that sell diet supplements and miracle weight loss aids). Boiron sold 566 million Euros worth of homeopathic remedies (e.g., water or sugar pills) in 2012.

15. Your minds are closed.

We are open to any new treatment, no matter how implausible, if only it can be shown to be safe and effective. Before we can ask how it works, we must ask if it works. If homeopathy had shown the same spectacular degree of success as penicillin, everyone would be using it. When Helicobacter was proposed as the cause of ulcers, it only took a few years for the evidence to accumulate and for antibiotics to become the treatment of choice. When a treatment like acupuncture has been studied for decades and even for centuries and its effectiveness is still uncertain, it is only reasonable to stop studying it and spend our

research money elsewhere. We don't need to keep an open mind about perpetual motion or a flat Earth, and we don't need to keep an open mind about homeopathy. CAM advocates are the ones whose minds are truly closed. Most of them hold their beliefs so firmly that they reject any evidence to the contrary. One practitioner told me he would keep using his pet method even if it were definitely proven not to work, because "his patients liked it."

16. Doctors don't do prevention.

They most certainly do! Who do you think invented vaccinations and preventive screening tests? Don't you know about the U.S. Preventive Services Task Force? Medical doctors routinely advise patients about weight control, diet, seatbelts and other safety topics, alcohol, drugs, domestic violence, exercise, etc. Studies on these topics are constantly appearing in the major medical journals. And there's no evidence that the preventive efforts of CAM providers result in any better health outcomes than those of MDs.

17. Doctors don't know anything about nutrition.

They understand the science of nutrition, advise their patients based on the available scientific evidence, and refer to dietitians for specific diet plans. CAM providers claim to know more about nutrition, but they usually give pseudoscientific or unfounded diet advice.

18. CAM is better because it's holistic.

CAM appropriated that idea from mainstream medicine. In medical school, doctors are taught that good medicine requires caring about the whole patient, not just treating the disease. Part of the standard medical history is a "social history." Good clinicians consider the patient's family, lifestyle, job, stresses, education, diet, socioeconomic status, beliefs, and everything about the individual that might have an impact on medical care.

19. Alternative treatments are individualized and can't be subjected to the same tests as pharmaceuticals.

Any treatment can and should be tested by scientific methods. For instance, homeopaths could prescribe individually in whatever way they chose and the remedies they prescribed could then be randomized with placebo controls and dispensed by someone else with double-blinding. And the objective outcomes of individualized CAM treatments can be compared to those of standardized conventional treatments.

20. Natural remedies don't get tested because they can't be patented and there's no profit in it.

Nonsense. About half of prescription drugs were developed from plants. The plant itself can't be patented, but the drug company can isolate the active ingredient and patent that, or even improve on it with a synthetic version that is more effective, more consistent, and has fewer side effects. They can patent a unique method of converting a plant into a pill. There's plenty of money to be made in herbal medicines, diet supplements, and even plain old vitamins: they generate billions of dollars in profits every year.

21. Treatment X worked for me.

Maybe, maybe not. You can only know that you improved after the treatment; you can't know for sure that you improved because of the treatment. That could be a post hoc ergo propter hoc logical fallacy. You may not be able to imagine any other possible explanation, but that doesn't mean there isn't one. Barry Beyerstein explained some of the many ways people come to believe that a bogus therapy works: the disease ran its natural course, a severe phase of cyclic symptoms reverted to the mean, the original diagnosis or prognosis was wrong, more than one treatment was used and credit was given to the wrong one, there was a placebo effect, they confused temporary mood improvement with cure, and psychological needs can distort what people perceive and do. (See http://www.quackwatch.com/01QuackeryRelatedTopics/altbelief.html.)

22. You shouldn't knock it if you haven't tried it for yourself.

Trying it for yourself is not a reliable way to find out if a treatment works. Personal experience can be very compelling, but it is all too often misleading; in fact, it tends to interfere with one's ability to objectively evaluate the scientific evidence. If the symptoms resolve, you have no way of knowing whether they resolved due to the treatment or whether they would have gone away anyway without treatment. Or whether some other factor caused the improvement. That's why science uses control groups. If you try a remedy and get better, it's reasonable on a practical basis to try it the next time you have the symptoms, but it's not acceptable to cite your experience as proof that "it works."

23. Huge numbers of people use X, and they couldn't all be wrong.

Oh yes they could! The argument from popularity is a fallacy: popularity is no indication of truth. Just think of how many people believe their horoscopes or consult psychics. For centuries, everyone believed bloodletting was effective in balancing the humors to treat disease. Only when it was properly tested did doctors discover they'd been killing patients instead of helping them.

24. It's been used for centuries: it must work, or people wouldn't have kept using it.

This is the argument from antiquity, the "ancient wisdom" fallacy. Our ancestors may have stumbled onto a few effective remedies by trial and error, but they didn't have the advantage of scientific knowledge, and they didn't know how to test remedies. It could be ancient wisdom, but it could just as well be ancient error carried over from a prescientific era.

25. It's natural, therefore it's safe.

Not necessarily. Many natural substances are deadly poisons. Any natural remedy must be tested for efficacy and safety by the same standards we use

to test "unnatural" remedies like pharmaceuticals. Herbs are drugs too, and anything that has an effect can have a side effect. If presumably "safe" herbal remedies were tested as rigorously as prescription drugs, some of them would prove unsafe.

26. There is proof that X is correlated with Y (cites study).

Correlation does not prove causation. The rise in the number of diagnoses of autism correlates almost perfectly with the rise in the sales of organic food, but that doesn't mean organic food causes autism. Apparent correlations can be due to chance, error, poor data collection, and many other things. There may not really be a true correlation, and even if there is, that doesn't tell us whether X caused Y or Y caused X or whether X and Y were both caused by Z.

27. There are hundreds of studies that show X works.

Most of the studies cited by supporters are in animals or test tubes; others are opinion pieces, speculations, and irrelevant studies. They won't tell you that there are other, better quality human clinical studies that show it doesn't work. Studies can be found to support almost any claim. Half of all published studies are wrong, for a variety of reasons that were explained by Ioannidis. (See http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0020124.) You can't just look at positive studies: you have to look at the entire body of published evidence. That's where systematic analyses come in. And even they may not reflect reality: there may be negative studies that we don't know about because they were never published: the file drawer effect and publication bias. And remember what Carl Sagan said: "Extraordinary claims require extraordinary evidence." It would take an extraordinary amount of evidence indeed to overthrow all the established science that tells us homeopathy can't possibly work as advertised.

28. We don't need studies; we have plenty of testimonials.

Ten anecdotes are no better than one; 100 are no better than ten. Anecdotal evidence is unreliable, no matter how many anecdotes you have accumulated. This lesson has had to be relearned over and over again throughout the history of medicine. Just think of how many testimonials there were for bloodletting throughout the Middle Ages and beyond. Anecdotes are useful, but only as a guide to what to investigate with scientific studies.

29. Are you accusing us of lying?

No. We believe you are sincerely telling the truth as you see it. We believe you had the experience you related. But that doesn't mean your interpretation of your experience is true.

30. If you think X doesn't work, why don't you do a study to prove it?

It's not that we think X doesn't work, it's that there is no evidence to make us think it does work. It is not up to us to prove a negative. The burden of proof is on the person making the claim. If I told you that putting a poker chip in your gas tank would give you better mileage, you should ask me to prove it. You are not obligated to design and conduct a controlled study to prove it doesn't work.

31. The medical establishment would drum out any doctor who tried to publish studies going against the party line, showing that X worked or that condition Y was real.

Quite the contrary. Peer review would critique the study. If it was a good study, it would be published; then others would investigate. A doctor who discovered a new disease or treatment would be honored. The idea of treating ulcers with antibiotics instead of antacids went against the party line, but Drs. Marshall and Warren won a Nobel Prize for discovering the role of Helicobacter pyloris. Luc Montagnier was awarded a Nobel Prize for discovering the virus that causes AIDS only two years after the first reports of "gay-related immune deficiency syndrome." Real diseases and new treatments are quickly recognized by the medical community.

32. You can't know about it if you haven't experienced it.

Yes you can. You don't have to have been bitten by a snake to know how to treat a snakebite. Male obstetricians are proof that you can deliver babies without having been pregnant yourself. We can know that antibiotics work for pneumonia without having had pneumonia ourselves. We can read the medical literature and learn far more from it than we could ever hope to learn from personal experience.

33. They laughed at Galileo. (The Galileo gambit)

Or any other lone genius who was ignored in his time. Sure, any crank might turn out to be right, but most cranks don't. If someone makes a questionable claim, we can look at his evidence. If he makes an idiotic claim without evidence, he deserves to be laughed at.

34. X is officially approved by . . . so it must work.

Proponents cite some organization or authority, such as Medicare, insurance companies, state licensing boards for acupuncture/chiropractic/naturopathy, the WHO, the courts, some hospital or clinic. . . . These organizations are not authorities when it comes to scientific truth; often they are not even experts in science. They are influenced by factors like politics, expediency, customer demand, economics, lobbyists, legal maneuvering, etc. No matter how many authorities approve of a treatment, it must still be properly tested to determine safety and efficacy.

35. The NCCAM is studying it, so there must be something to it.

The National Center for Complementary and Alternative Medicine is strongly influenced by politics and has wasted millions of taxpayer dollars studying improbable treatments with no scientific merit. The studies they have funded have never proved that any CAM treatment was effective. (See "Measuring Mythology: Startling Concepts in NCCAM Grants," SI, January/February 2012.)

36. Studies show it doesn't work, but what if it only works for me and a small minority of people like me?

That's possible, but not very probable. If it worked for a significant minority of people, it would have shown up in the data, would have affected the statistics, and would have changed the outcome of the study. If the minority was too small to affect the study outcome, what's the likelihood that you would be one of the special few that it actually worked for? The odds are against it, and there is no rational way to choose the one treatment that might work for you out of all the various treatments that have been tested and shown to be ineffective.

37. I was misdiagnosed/mistreated by a doctor. I will never consult an MD again. Now I rely on my naturopath/chiropractor/acupuncturist/homeopath (or on the testimonials of my friends).

If you get food poisoning, do you stop eating? If you get a bad batch of gasoline do you start putting water in the fuel tank instead? Anyone can make a mistake, and some doctors are incompetent. The rational solution is to find a more competent science-based doctor, not to switch to a less competent non-science-based source of advice.

38. I can't afford conventional medicine; CAM costs less.

If it costs less but doesn't work, that's false economy. Water costs a lot less than gasoline, but it won't run your car.

39. My doctor said nothing was wrong with me, but my CAM provider did a test conventional medicine doesn't do and found a condition that needed to be treated.

If conventional doctors don't do a test, didn't you ever wonder why they don't? Maybe they have a good reason. Has the test been validated? What is its specificity and sensitivity? Is a positive result more likely to be a false positive than a true positive? It may well be one of the many bogus tests and bogus diagnoses that abound in the world of CAM.

40. Conventional medicine doesn't have an effective treatment for my disease.

CAM doesn't either. They may tell you they do, but they will only offer false hope and waste your time and money. It might be wiser to accept that there is no effective treatment and concentrate on finding ways to cope with your illness and improve your quality of life.

41. Conventional medicine does some terrible things. Why don't you put your own house in order before you criticize others?

Conventional medicine is flawed, but it is constantly criticizing and policing itself. Current practices are continually being reevaluated and discarded if they are found ineffective. CAM has no such tradition of self-criticism; CAM practitioners never reject any treatment even if the evidence clearly shows it doesn't work.

42. Only 15 percent of mainstream medicine is based on evidence.

False. That estimate was based on a misunderstanding of a study from half a century ago that was never intended to estimate the percentage of treatments based on evidence. Bob Imrie reviewed the literature and found that 78 percent of treatments are based on compelling evidence, 38 percent on randomized controlled trials. (See http://www.veterinarywatch.com/CTiM.htm.) Academic neurologist Steven Novella estimates that nearly 100 percent of the treatments he recommends are based upon the best available evidence combined with plausible and rational extension of what is known, as well as adequate evidence for lack of harm (http://theness.com/neurologicablog/index.php/how-much-modern-medicine-is-evidence-based/). But think about it: even if a system were only 15 percent based on the evidence from scientific studies, wouldn't that be better than a system based on nothing but testimonials?

43. Why would so many doctors use CAM and recommend it if it didn't work?

Medicine is an applied science, and doctors are not scientists. Medical students have to absorb vast amounts of information in a short time; they are unlikely to question their teachers, they don't have the time to read the experimental evidence for what they are taught, they are not taught how to evaluate research studies, and they are not educated about the flaws of CAM. A lot of MDs know about science but don't really understand the scientific method, and there are those who understand it but choose to ignore it. There are those who are "shruggies," who think false claims from CAM don't matter, and there are those who are too overworked to keep up with evolving knowledge. And finally:

44. If CAM makes people feel better, why deny them that? Even if it's just a placebo, isn't that a good thing?

No. Placebos are unethical. Placebo effects tend to be small in magnitude and brief in duration, and disappointment soon ensues. Using a placebo may delay or replace effective treatment. Placebos can make asthma patients subjectively feel like they can breathe better when objectively their lung function is unimproved and they are still at risk—asthma attacks can be fatal. As the T-shirt says, "Science: It works, bitches." No other basis of medical care can begin to compete with it. The doctor-bashers are playing a losing game. ■

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Sweet Science of Seduction or Scam? Evaluating eHarmony

The popular online dating site eHarmony claims that its matching methods are both successful and scientific. But a closer look at the evidence suggests otherwise.

BENJAMIN RADFORD

As long as there are lonely hearts there will be a market for matchmakers. The emergence of the Internet has of course revolutionized many things, and the search for compatible mates is no exception. Online dating is a huge business, with dozens of websites offering people the chance to find love in cyberspace.

Like many services for which there is competition, online dating sites struggle to distinguish their services from all the others. After all, the premise is pretty basic: men and women searching for each other based upon their interests and profiles. There are only so many ways to "sex up" the process (so to speak); there's really not a lot of room for "new and improved" ways of connecting people.

However there is one important area in which online dating services try to compete: better ways of matching clients. Like many other businesses, online dating sites like to adopt the veneer of scientific validity. Websites such as eHarmony.com, True.com, and Chemistry.com claim to use science to help people find compatible partners and, eventually, love. But how good is the evidence for their claims?

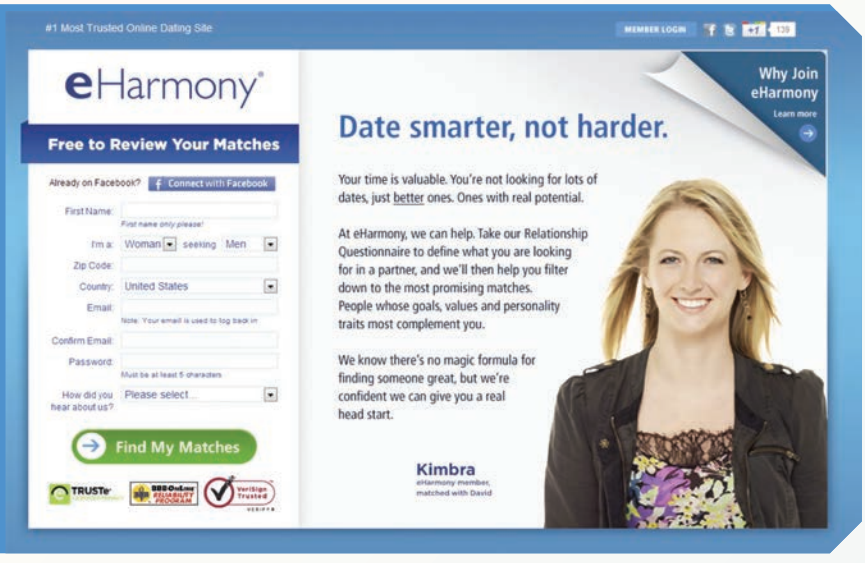
eHarmony's Scientific Claims

Perhaps the best-known dating service claiming to mix science with seduction is eHarmony. According to the company's website, its marriage profile, "developed by a team of clinical experts . . . is rooted in classical psychometric theory—which uses well-established standards to measure mental abilities and traits in a reliable way."

The site makes direct and explicit claims about the scientific validity of its matching program, which it calls a "Compatibility Matching System." On the website under a section titled "Compatibility Science," eHarmony states:

> Based on his thirty-five years of marriage counseling and studies of thousands of married couples, eHarmony founder Dr. Neil Clark Warren

Websites such as eHarmony.com, True.com, and Chemistry.com claim to use science to help people find compatible partners and, eventually, love. But how good is the evidence for their claims?


#1 Most Trusted Online Dating Site
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Please select...
Find My Matches
Why Join eHarmony
Learn more
Date smarter, not harder.
Your time is valuable. You're not looking for lots of dates, just better ones. Ones with real potential.
At eHarmony, we can help. Take our Relationship Questionnaire to define what you are looking for in a partner, and we'll then help you filter down to the most promising matches. People whose goals, values and personality traits most complement you.
We know there's no magic formula for finding someone great, but we're confident we can give you a real head start.
Kimbra
eHarmony member, matched with David

> exhaustively researched what makes marriages succeed and fail. His findings? Chemistry is not enough. . . . By studying the difference between happy and unhappy married couples, Dr. Warren's team of researchers found 29 Dimensions [a registered trademark] that help predict great relationships. These compatibility dimensions include: Core traits like emotional temperament, adaptability, curiosity, and intellect; values and beliefs, such as spirituality and feelings about children; and relationship skills, such as conflict resolution. (eHarmony 2011a)

Again appealing to the authority of science, the following paragraph explains how the "Science of Compatibility" is used by eHarmony: "Our Compatibility Matching System matches you by taking into account the 29 Dimensions of Compatibility that help predict the potential for relationship success. The results are single matches unlike anything you will find anywhere else."

In all, the words *science* or *scientific* appear five times within three short paragraphs on that web page. On a page that lists the eHarmony research team ("mandated to advance the scientific understanding of human relationships"), many of the members have titles like "Senior Director of Research and Development," "Senior Research Scientist," and "Research Scientist" (eHarmony 2011b). In short, eHarmony's claims to science and scientific validity are both explicit and implicit throughout the company's literature. Furthermore, a representative from eHarmony (Breton 2011) told me explicitly that "eHarmony's matching system was developed using an empirical, scientific process."

Other eHarmony Claims

All this seems very impressive, but there are questions about the validity of eHarmony's much-vaunted "scientific, 29-dimension" tests. Does its "science" greatly improve the quality (or odds) of a match? How well do its tests construct validity? What were the control measures? What is the scientific evidence for these claims?

Steven Carter, director of research at eHarmony, wrote an article in the APS Observer (published by the Association for Psychological Science) about his work. Instead of offering data or empirical evidence that eHarmony's matching system is valid (or superior to other dating sites' systems), Carter (2005) boasted about how helpful his work was to lonely singles and that "working at eHarmony has, in many ways, been a dream job."

While Carter offered little support for his claims, he did state that "to date, we estimate that over 9,000 eHarmony couples have married." That statistic, if true, clearly doesn't tell the whole story, as it cherry-picks the successes and omits the failures. How many of the eHarmony matches were incompatible? If, by one count, there are more than twenty million eHarmony members looking for matches or marriage, 9,000 may not seem like that impressive a success ratio. Furthermore, the real question would seem to be how many of those 9,000 marriages lasted longer than average; for all we know, most of the eHarmony couples may have since divorced.

Evaluating the Claims

Oddly, no references to studies scientifically validating eHarmony's methods appear on the company's website. Nor was I able to find any published research in an online literature review. There is actually very little available information about eHarmony's methods, which raised a troubling question in the mind of Robert Epstein, a contributing editor to *Scientific American Mind*: "Why would a major company such as eHarmony, which claims to have 12 million members, *not* subject its 'scientific, 29-dimension' test to a scientific validation process?" (Epstein 2007). He noted that eHarmony representatives presented a paper in 2004 that claimed eHarmony couples were happier than couples who met through other means, "But this paper still has not been published, possibly because of its obvious flaws." Four years after Epstein wrote that, there still appeared to be little or no data on eHarmony's methods.

In all, the words *science* or *scientific* appear five times within three short paragraphs on that web page.

I contacted Paul Breton, the director of communications for eHarmony, to ask for research: "I am specifically interested in any published studies or research that has tested the construct validity of the compatibility measures that eHarmony uses, and any research that demonstrates that eHarmony relationships last longer than average. Also, please provide references to any published studies or research by Neil Clark Warren on the subject of relationships, marriage, or compatibility."

Breton (2011) responded with a lengthy (1,400-word) email that read like boilerplate copy lifted from a press release. Breton mostly addressed questions I had not asked, including whether eHarmony's tests improved the chances of a match; whether eHarmony offers services to same-sex partners; how eHarmony measures the quality of their services; whether eHarmony clients were satisfied with their services and matches, and so on.

I read the entire study, and there was not a single word about any evidence for the claim that eHarmony is based on scientific principles.

In the final paragraph Breton finally addressed my query: "Two peer-reviewed papers have been published or are in press that have used data from eHarmony couples and are relevant to the efficacy of eHarmony's matching system. They are summarized below and attached for reference." Breton's email ended with a list of nearly twenty articles and pieces by eHarmony Senior Director of Research and Development Dr. Gian Gonzaga, though none of them were relevant to my query.

A Closer Look

I was slightly surprised that eHarmony only provided two studies, and as I read through the studies I immediately found problems.

The first study, "Assortative Mating, Convergence, and Satisfaction in Married Couples," (Gonzaga, Carter, and Buckwalter 2010) had nothing to do with the scientific validity of eHarmony's tests or measures but instead discussed marital satisfaction in general.

The abstract noted, "This work investigates assortative mating and convergence in personality and their effect on marital satisfaction. Measures of personality were collected from a sample of married couples before they met and twice after they were married. Results showed evidence for assortative mating but not for convergence in an average couple." As far as I could tell, the only relevance to eHarmony was that all three coauthors were employed there. This was clearly a red herring.

I then reviewed the second study (Carter and Buckwalter 2009). This piece was coauthored by Steven R. Carter and J. Galen Buckwalter (both of eHarmony; the following conflict of interest disclosure appears at the bottom of the title page: "The reader should be aware that the authors are employed by, and have a financial interest in the success of, eHarmony.com, Inc."). This piece

> investigates the effects of a broadly adopted online matchmaking site on the nature and quality of married couples formed. Measures of personality, emotion, interests, values, and marital adjustment were collected from a sample of married couples who had been introduced by an online matchmaking service, and from a sample of married couples who had met through unfettered choice. Results showed that couples introduced by the online matchmaking site were more similar. . . . We conclude that online matchmaking services based on predictive inference and proscribed selection can be observed to have a significant and meaningful impact on marital quality.

In other words the eHarmony team concluded, unsurprisingly, that couples introduced through an online dating service (say, for example, eHarmony) tended to be more similar than couples who met randomly—and that this similarity would likely lead to a better or longer-lasting marriage. That was it; I read the entire study, and there was not a single word about any evidence for the claim that eHarmony is based on scientific principles, or that its much-hyped, carefully constructed "29 Dimension" questionnaires were scientifically valid.

I then became curious about the journal in which this piece appeared, *Interpersona*. Why were eHarmony's top scientists publishing their research in a journal I'd never heard of? I did some research and discovered that it's published by something called the Brazilian Association for Interpersonal Relationship Research, which I had also never heard of. I did an online search (in late 2011) and found a grand total of six hits for this organization on the World Wide Web (the *Journal of the American Medical Association*, by way of comparison, has nearly ten million hits). Clearly this was not a prestigious or well-known professional organization; in fact, by all appearances the Brazilian Association for Interpersonal Relationship Research is a dummy organization, and its journal *Interpersona* is basically a vanity press for interpersonal dating researchers to get work e-published. The fact that eHarmony's top researchers published here raises serious questions.

Dr. Warren's Research

I also searched for evidence that Neil Clark Warren, the marriage and relationship expert behind eHarmony, has created important work in, and published on the subjects of, marriage or relationships. A 2011 search of several academic databases (including PsycInfo and MedLine) did not reveal a single article published by Neil Warren on the subject of marriage, compatibility,

or relationships. If Warren has been researching the subject for the past thirty-five years as is claimed ("based on his 35 years of marriage counseling and studies of thousands of married couples, eHarmony founder Dr. Neil Clark Warren exhaustively researched what makes marriages succeed and fail"), why hasn't he published it? You would expect that a scientist or researcher who has spent decades studying a topic would have published on it. (Warren is author of several books on relationships, though anyone can write a book of relationship advice.)

Breton (2011) admitted that Warren had little or no role in creating eHarmony's current matching system: "While Dr. Warren founded eHarmony and has played an important role within the company, he is not the sole (nor even a primary) person involved in conducting academic-style relationship research or developing our matching algorithms." This is probably just as well, since it appears that despite his thirty- five years of "exhaustive" research, Warren never published a single study on the topic.

More Questions about Validity

I responded to eHarmony's Breton with a few simple questions:

> You reference the journal *Interpersona*, which neither I nor any of my colleagues have heard of. . . . Is this the highest profile publication that eHarmony's research has appeared in? Have any of your team published in any mainstream, peer-reviewed psychology or sociology journals . . . such as *American Psychologist*, or *International Journal of Applied Psychology*, or *Journal of Experimental Psychology*, or *British Journal of Psychology*, or *Psychological Bulletin*, or *Psychological Review*, or *Social Psychology*, and so on?

Breton responded, saying:

> The critiques you raise seem to confuse "scientific" with "fully transparent." One can still use a scientific method, which eHarmony does, without exposing every last detail to the public. . . . eHarmony's matching system was developed using an empirical, scientific process. The founding research team administered a standard measure of marital satisfaction (the Dyadic Adjustment Scale) to thousands of married couples and rank-ordered the couples on the basis of their relationship satisfaction. Then a separate survey was administered to assess the personality traits, values, attitudes, and beliefs of the couples to determine what qualities distinguished the happiest couples (those in the top quartile) from all the others. Using those insights, a final survey instrument was developed to predict which pairings of single individuals would share the most commonalities with the happiest married couples in the survey.

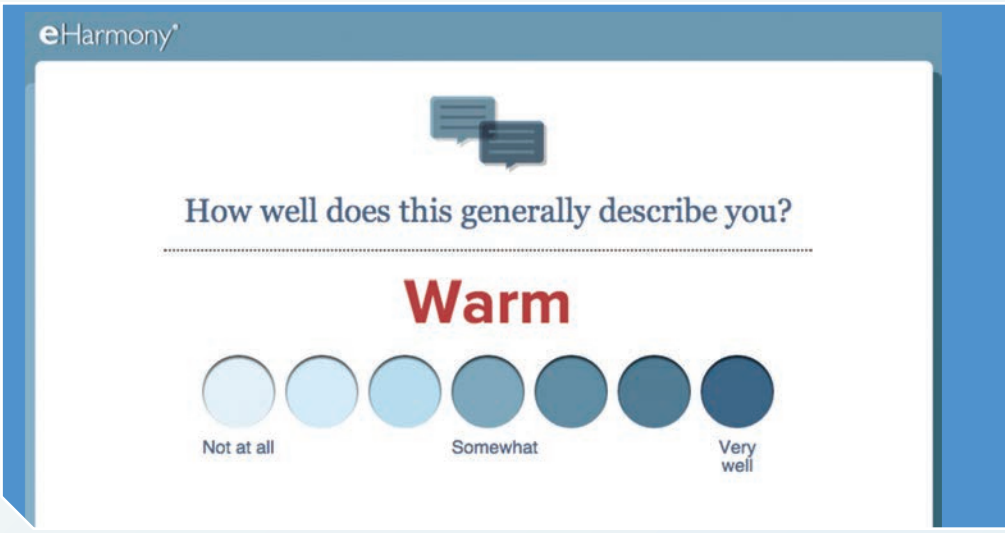
The next statement from eHarmony's director of communications was particularly telling:

> While many of the details of those studies have been published, not everything has been disclosed in a peer-reviewed journal. As a rule, academic journals in the behavioral sciences do not publish articles that validate or promote the efficacy of for-profit technologies. There are also intellectual property considerations eHarmony has to balance. None of this, by default, makes eHarmony's scientific process any less valid. Furthermore, while there are many merits to peer-review, it is not the only measure of scientific validity.

Here we have several interesting admissions, including that "not everything" (in fact, nearly nothing) about eHarmony's research has appeared in peer-reviewed journals. Breton's claim that peer-reviewed journals do not publish articles that validate or promote for-profit technologies is specious: respected scientific journals routinely publish studies and articles about the validity and efficacy of for-profit technologies, including pharmaceutical drug studies, medical implants (new artificial hips or joints, for example), experimental therapies, and so on. Furthermore, scientists employed by for-profit organizations regularly publish research that does not reveal trade secrets or proprietary intellectual property.

I concluded my correspondence with Breton:

> I don't think I'm confusing "scientific" with "fully transparent" at all. I'm simply requesting references to published studies in peer-reviewed journals regarding the scientific validity of eHarmony's tests, which you claim have been scientifically validated. I specifically requested published studies "that investigate and test the validity of eHarmony's compatibility tests (not relationship advice in general)." The two references you provided, from *Interpersona* and *Personal Relationships*, do not contain anything about the validity of eHarmony's testing methods, scientific validity, or matching system. Unless you can provide me with references, I will assume that you cannot



> provide published, peer-reviewed research that specifically tested and validated eHarmony's compatibility tests. I know how to read journal articles [and] so far you have not shown me anything resembling good science behind eHarmony's methodologies. If you have the studies I'm asking for, give me the references. If you don't, then just admit it.

I never heard any more from eHarmony.

My search for the science behind eHarmony had come to an end. I had searched the eHarmony website in vain for any reference to studies or research validating eHarmony's tests, measures, or matching criteria. I searched the psychological and medical literature, both for scientific research done by the company's founder, Neil Warren, or by any current employees, and found nothing. Finally, I contacted a representative for eHarmony, who was ultimately unable to provide a single reference (published or unpublished, peer-reviewed or not) to any research confirming the scientific validity of eHarmony's methods. Surely if eHarmony had conducted solid, scientific research validating its methods it would be happy to publicize them. In fact, eHarmony has several hallmarks of pseudoscience, including a reluctance to subject its claims and data to peer review.

My search for the science behind eHarmony had come to an end. I had searched the eHarmony website in vain for any reference to studies or research validating eHarmony's tests, measures, or matching criteria.

In 2013, eHarmony's senior research scientist, Gian Gonzaga, gave a presentation at the annual Society for Personality and Social Psychology conference in which he tried in vain to convince his colleagues of the scientific validity of eHarmony's methods. Gonzaga, while reiterating that eHarmony's formulas are secret and proprietary, offered evidence from unpublished, nonpeer-reviewed studies that he claimed demonstrated that a couple's questionnaire scores correlated with relationship satisfaction years later.

Critics such as the University of Rochester's Harry Reis, who coauthored a study of eHarmony's methods (Finkel et al. 2012), saw the matter differently. According to John Tierney (2013) of *The New York Times*:

> He and his coauthors argued that eHarmony's results could merely reflect the well-known "person effect": an agreeable, non-neurotic, optimistic person will tend to fare better in any relationship. But the research demonstrating this effect also showed that it's hard to make predictions based on what's called a dyadic effect—how similar the partners are to each other. . . . "If dyadic effects are real, and if eHarmony can establish this point validly, then this would be a major advance to our science," Reis said. But he and his colleagues said that eHarmony hadn't yet carried out, let alone published, the sort of rigorous study necessary to prove that its algorithm worked. . . . To verify the algorithm's effectiveness, the critics said, would require a randomized controlled clinical trial like the ones run by pharmaceutical companies. Randomly assign some individuals to be matched by eHarmony's algorithm, and some in a control group to be matched arbitrarily; then track the resulting relationships to see who's more satisfied.

Reis's coauthor, Northwestern University's Eli Finkel, added, "Nobody in the world has the treasure chest of resources for relationships research that eHarmony has, so we can't figure out why they haven't done the study."

Of course, plenty of people can find compatible matches on eHarmony (or any other dating service) without the help of scientifically validated tests; wonderful, lasting relationships sprout all the time by random chance. But if people are choosing eHarmony over a competitor because they believe that there is some validated science behind the matching, they are likely being misled. *Caveat emptor*.

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Video Game Violence and Pseudoscience: Bad Science, Fear, and Politics

Research continues to find that violent video games play a negligible role in societal violence. But the politics of a culture war won't let the idea go.

CHRISTOPHER J. FERGUSON

In May 2013, Christopher Harris went on trial for the murder of a family of five in Beason, Illinois. With overwhelming forensic evidence as well as testimony by his own brother indicating he was guilty, Harris's defense chose an unusual tactic. Harris claimed it was not he, in fact, who committed the murders but the family's fourteen-year old son Dillen Constant. Dillen, the defense claimed, had a history of attention deficit disorder, school problems, and had several violent video games in his bedroom. According to Harris, it was Dillen who killed his family. Harris claimed he happened to walk in on the multiple murders and had to defend himself from Dillen by beating Dillen fifty-two times with a tire iron, incurring only a blister himself.

Harris was supported in his defense by a video game violence researcher who agreed that Dillen's history of attention deficit disorder, school problems, as well as possession of violent video games placed him at risk for aggressive and violent behavior (Rushton 2013).

During cross examination, however,the expert in question acknowledged that he was not a clinical psychologist, held no professional license, had not verified information given to him by the defense, and had not questioned Dillen's surviving family or other witnesses. Related to video games, the expert acknowledged he did not know how often Dillen played violent video games (an analysis of the game console's saved games suggested play was infrequent), acknowledged most young boys play violent video games, acknowledged research cannot document links between video games and violent behavior, and at one point stated that even games such as Pac-Man could be considered violent video games under some definitions. One of the assistant district attorneys was later overheard saying, "The most offensive testimony I've ever heard in my life, I think" (Rushton 2013). Harris was convicted.

Thus the theory that violent video games increase aggression continued to fail when evaluated by independent courts. In 2011, the U.S. Supreme Court considered an effort by the state of California to regulate violent video game sales to minors (*Brown v. EMA*,

2011). In speaking about studies California used to support its regulatory efforts the majority decision of the court said:

These studies have been rejected by every court to consider them, and with good reason: They do not prove that violent video games *cause* minors to act aggressively (which would at least be a beginning). Instead, "[n]early all of the research is based on correlation, not evidence of causation, and most of the studies suffer from significant, admitted flaws in methodology" (*Video Software Dealers Assn.* 556 F. 3d, at 964). They show at best some correlation between exposure to violent entertainment and minuscule real-world effects, such as children's feeling more aggressive or making louder noises in the few minutes after playing a violent game than after playing a nonviolent game.

The social narrative linking violent games to mass shootings is a powerful one, providing an explanation for the unexplainable and providing an illusion of control over the uncontrollable.

Just prior to the decision, Hall, Day and Hall (2011) warned that the scholarly community risked a credibility crisis by making increasingly extravagant claims about the alleged dangers of violent video games, much as the alleged dangers of "immoral" comics purported by psychiatrists in the 1950s are now generally considered a cautionary tale about moralistic excess in science.

In a previous article in the Skeptical Inquirer (Ferguson 2009) I discussed some of the serious methodological issues that have limited much video game violence research. These have included aggression measures that bear little resemblance to the types of behaviors of interest to the general public (for example filling in the missing letters of words such that *kill* is more aggressive than *kiss*, or giving consenting opponents in a reaction time game bursts of annoying noise), the unstandardized use of aggression measures (which potentially allow researchers, even in good faith, to select outcomes that best fit their hypotheses while ignoring those that don't), and the failure to control carefully for variables such as gender and family violence that might explain correlational relationships between video game violence and aggression (or failure to inform general audiences that controlling for these other variables reduces correlations to trivial levels). Unfortunately, to a great degree, these problematic issues persist in the field. The field continues to ignore the warnings of Hall, Day, and Hall (2011) by making big claims based on weak and inconsistent data. In this article I explore the culture and politics of video game research for some explanation for why this may be.

Science, Morality, and Culture

Let me note upfront that there is nothing unscientific about the hypothesis that video game violence may cause aggression. The hypothesis is a perfectly reasonable empirical question. Further, I wish to be careful not to paint with an overly broad brush. Some scholars who have found links between video games and some aspects of aggression have been very careful to speak within the limits of their data (e.g. Giumetti and Markey 2007; Williams 2013), and I have nothing but respect for their work. The issue is when scholars speak beyond their data in pursuit of moralistic or advocacy goals. Arguably, in the months following *Brown v. EMA* (2011) the rancor of the video game field calmed somewhat. Not surprisingly, the tragic Sandy Hook shooting in December 2012 changed the climate significantly once again. It is probably difficult to overestimate the impact that mass shootings as cultural events have had on the video game violence field. When shooters are young males—such as in the case of Sandy Hook shooter Adam Lanza—that these individuals are often found to have been players of violent games is typically treated as a startling and critical revelation, usually ignoring that almost all males in this age category play violent video games at least occasionally (Olson et al. 2007). Despite this, some young shooters such as the Virginia Tech shooter were ultimately found not to be avid gamers (Virginia Tech Review Panel 2007) despite rumors to the contrary, and the U.S. Secret Service report on school shooters (2002) found little evidence that such individuals are particularly inclined to enjoy violent media more than anyone else. In the official investigation report by the state of Connecticut (2013) it was found that Lanza had more interest in playing non-violent video games like *Dance, Dance Revolution* than violent ones, although, like most young men, he owned some of both. Yet the social narrative linking violent games to mass shootings is a powerful one, providing an explanation for the unexplainable and providing an illusion of control over the uncontrollable. Thus we find a kind of societal confirmation bias in which cases that don't fit the narrative (such as Virginia Tech) are simply discounted. In the case of older and/or female shooters, the issue of video game or media violence is typically ignored altogether.

One question is what impact these social narratives and social fear of mass shooters have on video game violence research. For instance, in a recent essay (Ferguson 2013) I noted that the language of video game researchers changed remarkably after the 1999 Columbine massacre, from language that acknowledged inconsistencies in the data to language of absolute certainly of harmful effects, despite little change in the actual data. In his discussion of moral panic theory Gauntlett (2005) notes that moral panics persist, in part, because society provides incentives for certain types of conclusions—those supporting the panic—over oth-

ers at least in the short term. Thus it becomes easier as a researcher to get a research grant arguing that video games are harmful, to get newspaper headlines, and to get esteem from professional organizations. The political pressure on scientists was made apparent in the weeks and months following Sandy Hook. In the early months following Sandy Hook, only rumors, ultimately unfounded, suggesting Lanza was an avid violent gamer, were available to the public, not facts. Yet politicians such as Sen. Jay Rockefeller, a Democrat from West Virginia, and Rep. Frank Wolf, a Republican from Virginia, called for "research" while advertising very clearly for the results they wished to see. For instance, Senator Rockefeller seemed particularly incensed by the *Brown v. EMA* (2011) decision and, in calling for a National Academy of Sciences study of media violence, stated, "Recent court decisions demonstrate that some people still do not get it. They believe that violent video games are no more dangerous to young minds than classic literature or Saturday morning cartoons. Parents, pediatricians, and psychologists know better. These court decisions show we need to do more and explore ways Congress can lay additional groundwork on this issue. This report will be a critical resource in this process" (quoted in Terkel 2012). This is hardly a call for careful, objective research with no a priori assumptions about what it "should" find.

An example of the problematic mixture of politics and science is also exemplified in a report examining media violence commissioned by Wolf, a longtime anti-media advocate. Rep. Wolf, who chairs the congressional committee overseeing the budget of the National Science Foundation (NSF), asked the NSF to produce a report on youth violence including the influence of media violence on societal violence. The resultant report (Subcommittee on Youth Violence 2013) concludes that the mass media are definitively linked to societal violence potentially up through and including mass shootings.

The report makes this conclusion by simply failing to cite, with almost surgical precision, the multitude of studies that would challenge this conclusion. The only exception was the citation of Joanne Savage's work (Savage and Yancey 2008) implying proven links between media violence and violent crime, despite the fact that Savage concluded the exact opposite. I argue that this report is a classic example of the risks of politicized science, particularly following a traumatizing national event. By contrast, almost simultaneously, an anti-media advocacy group, Common Sense Media (CSM), released a report on media violence (2013). Although I disagree with the conclusions of this report, I applaud CSM for honestly reporting research both supporting and contradicting their concerns and framing their arguments in a thoughtful and careful way. The CSM and NSF reports can, in fact, be compared side-by-side to illustrate my concerns. When a media watchdog can produce more careful science than a subcommittee assembled by the National Science Foundation, the time has come to reevaluate what we are doing in the field.

The Role of Professional Organizations and the Scientific Culture

One interesting development is that, in recent years, a contrast has emerged between conclusions on video game violence researched by independent evaluators such as the U.S. courts, as well as government reviews by Australia (Australian Government, Attorney General's Department 2010) and Sweden (Swedish Media Council 2011) and even the U.S. House of Representatives in the months following the Sandy Hook shooting (Gun Violence Prevention Task Force 2013), and conclusions expressed in policy statements of professional advocacy groups such as the American Academy of Pediatrics (AAP 2009) and American Psychological Association (APA 2005). It's probably difficult to underestimate the impact these policy statements by the AAP and APA have on debates regarding video game violence, as they are often cited in support of fears or even regulation and censorship. By contrast, independent reviews tend to be far more skeptical. Part of the reason for these discrepancies appears to be that professional advocacy groups have typically not conducted independent reviews. Rather they assembled committees of scholars highly invested in a particular theory, did not invite more skeptical scholars, and these scholars, in essence, reviewed their own work and declared it beyond further debate (something I'd love to be able to do one day).

These reviews should not be mistaken for careful, objective evaluations of the research field. To their credit, the American Psychological Association is currently reviewing their policy statement on video game violence, although it is unclear whether it has entirely learned the lesson of previous problematic statements. Wisely, scholars directly involved in media violence research were not included on the task force, and all seven members of the task force are very reputable scientists. Unfortunately, even a brief Internet search reveals that four of the seven have taken public anti-media stances in the past. Two were signers of an amicus brief in *Brown v. EMA* supporting California's attempt to ban violent video game sales to minors. One was a coauthor on the problematic NSF report mentioned earlier. The most minor of the four collaborated with a well-known anti-media scholar in the past and made anti-media statements to the press. My

When a media watchdog can produce more careful science than a subcommittee assembled by the National Science Foundation, the time has come to reevaluate what we are doing in the field.

intent is not to disparage these individuals but to suggest that if the APA's intent had been to select an ostensibly neutral committee of evaluators, they widely missed the mark. Perhaps partly in response to this, a group of 230 scholars recently wrote to the APA asking them to retire their problematic policy statements on media violence (Consortium of Scholars 2013). Policy statements often tell us more about the committee than the science and highlight the fact that it's possible to "tilt the machine" toward a predetermined conclusion through the selection of specific committee members.

Ultimately, however, it is the culture of the media scholars themselves that has been problematic. In one recent essay, a prominent scholar labeled all those who disagree with him as "industry apologists" (Anderson 2013). Science is about open inquiry, skepticism, attempts to critically replicate findings, and put the burden of proof on a theory to be replicated. Yet, in this field, the burden of proof is often reversed, with skeptical scholars personally subjected to ad hominem attacks. Increasingly, like other areas of social psychology, the "harm" position of video game violence is suffering a crisis of replication (see Ballard et al. 2012; Charles et al. 2013; and Tear and Nielson 2013 for just a few recent examples). Youth violence continues to plummet during the era in which video game sales have skyrocketed (Childstats.gov 2013). And yet I'd argue that at least parts of the academic field of video game violence have stubbornly calcified around an inflexible ideology and view all critics not as scholars who respectfully disagree but as enemies of a lesser moral fiber (hence the "industry apologists" comment). More than one outside researcher has asked me what it is about aggression researchers that makes them so aggressive. Perhaps that is what we should be asking: Does conducting video game violence research make you aggressive? If so, perhaps we should put warning stickers on academics. But jesting aside, the time has come to reevaluate the culture of video game research and what it has done to the objectivity of the data it has produced. At the current stage, the field risks becoming little more than opinions with numbers. Still, I note a new cadre of researchers doing excellent work (as exemplified by the scholarship on display throughout Quandt and Kroger 2013) wherein games are examined as an integral part of society rather than assumed a priori to be an enemy of it. This does not rule out the possibility that media influence us, of course, but rather places media within society, and the process of media as user-driven rather than content-driven, idiosyncratic rather than generalized. This trend toward greater sophistication in games research has been a relatively new trend, and it's one I hope will thrive despite an academic culture that often actively discourages it. ■

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Dr. Phil and the Hummingbird

A medium made a seemingly impressive guess about a hummingbird on a national television talk show. A follow-up investigation finds it not so striking after all—for the birds, in fact.

JAMES UNDERDOWN

"She couldn't have known that!"

I wish I had a nickel for every time I heard that from an amazed client of a psychic or medium. We skeptics spend a fair amount of time trying to understand and explain how mediums can *appear* to know details about people—living or dead—they've never met.

Of course, classic cold reading techniques explain why so many find this illusion persuasive. Cold reading can incorporate a number of skills mediums use to give the "sitter" (client) the appearance of communicating (in both directions) with the dead. Such techniques may include, but are not limited to:

- Observing the sitter's clothing, jewelry, hairstyle, demeanor
- Listening closely for regional accents, level of vocabulary/education
- Watching body language for cues of acceptance or resistance
- Making statements that have meaning or significance to most people
- Making statements that sound very specific to the sitter

It's that last category that I want to tackle here, because it's the accuracy of those specific guesses that seems to impress people most about mediums. But the question of accuracy can only be addressed when the guesser's ammunition is known.

A gun analogy may help illustrate this concept. Which is more impressive, hitting a target with a .22 caliber rifle, or a shotgun? Psychics and mediums use shotguns, and many carry gobs of shells. A blazing 12-gauge occasionally hitting a small target—say, a hummingbird—just isn't that remarkable.

I tried to explain this idea a couple of years ago on *The Dr. Phil Show* when Dr. Phil became impressed by a guess made by alleged medium Rebecca Rosen. Rosen is one of a relatively small number of mediums who command big bucks and have long waiting lists of eager customers.

Dr. Phil's experiment was to record video of Rosen and me each reading ten strangers in a small room at Paramount Studios. It was my first reading, while she had done thousands at that point. The next day, we shot the live show with an audience present. My goal was simply to show that even a green amateur like me could convince people I had psychic powers by using simple techniques. I believe I did—three of the ten sitters cried, which ironically gave me a great sense of relief because it meant I was convincing.

The readings were heavily edited before they were aired, but at one point, a woman grew astonished that Rosen had known about her hummingbird tattoo.

Here's a transcription of that segment:

> **Rebecca Rosen:** I'm supposed to talk about a hummingbird . . .
> **Woman:** Oh my God!
> **RR:** Nice! That's from your guide. And your guide is saying the hummingbird's your sign from me to know this is real and to know I'm with you.
> **Woman (crying):** Oh my God! That's my tattoo!

During the live taping the next day, Dr. Phil seemed to agree with the woman that this was amazing. I tried to explain:

> **Dr. Phil:** So Jim, what do you say about that?
> **JU:** I say she's a lot more experienced and she got a lot more guesses out. Part of how this works is, do a lot of guesses. (There is an edit here. Whatever I said next was cut.)
> **Dr. Phil:** She goes to hummingbird. . . .Now come on, that's a pretty random guess, if you're talking about a guess.
> **JU:** Phil, if she would have said, "You're the person who's got a hummingbird tattoo," then I would have been impressed. That's not what happened. She said I'm getting a hummingbird.
> **Dr. Phil:** She was speaking directly to this woman. Listen, don't set up a paper tiger (sic) and then tear it down. You know she was talking directly to that girl.
> **JU:** I don't know how many guesses she made with that girl. She might have guessed 500 things . . .
> **Dr. Phil:** Well, how many are you going to go through before you say hummingbird?

Again, my next comment was edited out. But Phil was right. I had no way of knowing how many guesses she made. My cold reading of the ten people lasted about fifty minutes. I assume Rosen probably had a similar amount of time, but since only a few minutes of our readings aired, and they were highly edited, there was no way to know if Rebecca was using a shotgun or a .22.

That episode aired in May of 2012. For a long time I wondered if Rebecca Rosen was a great cold reader, a prodigious guesser, or just lucky.

Then *I* got lucky. Someone I know—I'll call her Lucille —paid $1,000 for a reading from Rebecca Rosen. Rosen's rate (at that time) was $500 for a one-hour telephone reading, but the $500 rate meant getting in a year-long line. Lucille, who was grieving the sudden loss of her fifty-something-year-old husband, felt like she couldn't wait, so she ponied up the grand. That's just over $16.66/minute if you're counting.

Rosen includes a recording with every reading and Lucille loaned it to me for analysis. The first step toward analyzing the 59 minute and 7 second reading was to write out everything that was said. (Many thanks to Susan Gerbic for her invaluable help transcribing the recording.) I color-coded the entire reading so I could see how Rosen was spending her time.

I wanted to know how many questions Rosen asked and how many guesses she made. The guesses were divided into two categories: 1. Statements she made that could be verified by Lucille or her family and friends. 2. Statements she made that concerned what the deceased or other "spirits" were up to *during* the reading.

Here are some statistics about what happened during the reading:

- The full recording lasted 59:07, but Rosen actually spoke for only 45:45. The rest of the time consisted of Lucille or her two daughters speaking or of pauses. At that rate, she costs almost $22 a minute!
- During the nearly one-hour reading, Rosen asked 148 questions—about one every twenty-four seconds.

"Well, how many (guesses) are you going to go through before you say hummingbird?"

- 410 guesses!
- Rebecca made 371 statements during the almost forty-six minutes she

Since only a few minutes of our readings aired, and they were highly edited, there was no way to know if Rebecca was using a shotgun or a .22.

James Underdown on the *Dr. Phil Show* episode that psychic Rebecca Rosen appeared on.

spoke (one every 7.4 seconds!)

- Of the 371 statements, eighty-eight concerned the real world and could be checked for their accuracy. For example, "So he showed me the death in the car." (The man did not die in a car.)
- The other 283 statements Rosen made concerned matters happening in the spiritual realm like "He's jumping up and down" or "He's telling me to tell you he shaved his beard off" or "He wants me to tell you guys that he has changed his name over there." Conveniently for Rosen, there is no way to fact-check these kinds of declarations, but they still *sound like* communicating with the dead.

❖ There were thirty-nine more statements that were more like advice: "Yeah, so you're asking how do I lose weight, simply cut that [sugar] out and you lose weight," for example.

Rosen's asking of 148 questions may not be in the true spirit of *reporting* from the "other side," but it did serve a few purposes. It ate up time—both in the asking and in the sitters' answering—which is not a bad idea when you're getting paid by the hour. Asking a question every now and then keeps others in a conversation engaged and feeling like you care about them. Also, the *answers* to the questions may steer Rosen toward better future guesses. Here's a good example of this from the reading:

> **RR:** Is he [the living husband of one of the sitters] trying to start a new business?
> **Answer:** He has a lot of business ideas.
> **RR:** There is a lot that he's like overwhelmed with. . . . They're showing me his head's spinning with the new work or taking on one more project. . . .

The answer steered her toward a more believable follow-up guess.

If the number of questions she asked was a surprise, the number of statements she made was astounding. Rosen's total of 410 statements (one about every seven seconds) is where her expertise lies. Try making up a statement about someone (real or imagined) once every seven seconds and see if you can sustain that for even five minutes. This extraordinary number of guesses sheds new light on the "hits," or accurate statements, that she got. By keeping the guesses flowing at a rapid pace, she greatly increases her overall chance at saying something significant to the sitter. It's as clear an advantage as target shooting with a shotgun instead of a rifle.

I learned that Rosen's mention of a hummingbird to the woman on the *Dr. Phil Show* was not particularly unusual for her. It's just another BB in her shotgun shell. Rosen fished for some kind of "bird" significance about four minutes into Lucille's reading when she mentioned a "hummingbird or type of bird that sings to you." In yet another Rebecca Rosen recording I acquired, a bird-related guess pops up again. There she said of the sitter's (deceased) mother, "She has used a bird . . . a pigeon . . . a seagull . . . and you know it's a direct sign from her."

Apparently, mentioning hummingbirds (or birds in a general sense) pays off often enough to throw it out there. In the three examples of Rosen's work I had access to, she tried hummingbird twice and a more generic bird reference the other time. Other repeat guesses included playing poker, jumping up and down, smiling, family pictures, someone named George, a dog, Rob or Bob, David, Dan, being pregnant, San Diego, April, and so on. By the way, augury—the practice of divining of the future by observation of natural phenomena like the behavior of birds—is millennia-old. We seem to notice the birds. Hell, I saw a hummingbird the other day. Which one of my many dead relatives was *that*?

So here's the answer to Dr. Phil and anyone else who asks, "How could she have known that?"

She didn't know that. She asked lots of questions, made an extraordinary number of statements and some of them happened to mean something. Many—most, actually—meant nothing, were impossible to check, or were demonstrably wrong. And the onus of finding significance in any statement was on the *sitter*, who desperately hoped the contact with the dead loved one was real.

Sitters like Lucille spend their readings scanning their memories to make sense of the multitude of guesses that are heaped at them. When a few of the guesses happen to connect with a real person—a recent event, a piece of jewelry—from the sitter's life, the connection is seen as a sign that their departed loved one is not really completely gone. Even if no connection can be made between a guess and a sitter's life, they are assured it will *eventually* make sense. When Lucille couldn't connect something Rosen said to her life, Rosen would say things like "You think about it" or "I would look into that."

It's the perfect racket. Guess until you're blue in the face and hope you touch a nerve. And if you don't, just convince your high-paying clients your words will someday be meaningful. They'll either keep searching until our random world turns a guess into a prophecy, or forget to even try. Either way, the check will have cleared. People pay mediums because the illusion of communicating with the dead taps all too well into our desires, our pattern-seeking, dot-connecting minds, and our heavy hearts.

What do you really get for $1,000? An expedition (loaded with shotgun shells) hunting for the occasional hummingbird. ■

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Some Popular Global Warming Factoids

Norman Mailer coined the word *factoids* to describe facts that have no existence before appearing in a magazine or newspaper, but once they do appear they are accepted without question. Some global warming deniers are especially fond of them.

JOHN EADES

Factoids, according to Norman Mailer, are plausible statements made with great authority but no empirical backing. Even those of us who pride ourselves on our critical faculties sometimes accept them unquestioningly on the assumption that the author or reporter who made them has checked them out properly, so it's okay to believe or repeat them. Mailer might have added radio and television to his list and, today, certainly, the Internet—the medium that seems to have been especially conceived for the promulgation of factoids.

Journalists, politicians, letter writers, and media pundits who deny the reality of anthropogenic global warming (AGW) seem to be unusually factoid-prone. What follows is my attempt to "de-authoritize" a few of their apparently unsinkable favorites. Factoids being what they are, I do not expect to succeed.

They Can't Even Get Tomorrow's Weather Forecast Right

"Nobody believes a weather prediction twelve hours ahead. Now we are asked to believe a prediction that goes out 100 years into the future" (Crichton 2003).

Like the late Michael Crichton, MD, novelist, film producer, and trusted adviser to President G.W. Bush, many people believe that climate scientists make weather forecasts far into the future. This would mean predicting day by day, and for an extended period (like the 2090s), morning, noon, and nighttime temperatures for New York, Tokyo, Paris, Copenhagen, and a multitude of other places around the world. Besides being a battle lost in advance, such an effort would also be quite pointless, since to understand the global impact of climatic change, we don't need hour-by-hour weather maps for every locality on the planet. We do need things like the planet-wide average of the surface temperature. Almost all climate scientists now agree that this is rising, and that the main culprit is our loading of the atmosphere with ever more CO_2 by the burning of ever-greater quantities of fossil fuels. What this extra warmth will mean for life on Earth in the coming decades depends on factors like the future consumption of these resources.

Volcanoes Are Worse Than Fossil Fuels

"That volcano in Iceland has totally erased every single effort made by the world's governments through the Kyoto Treaty. And there are around 200 active volcanoes on the planet spewing out CO_2 *and ash at any one time—EVERY DAY"* (Tipp 2011).

The 2010 eruption of Eyjafjallajökull in Iceland was, as such things go, peanuts. It nevertheless disrupted airline services worldwide, giving Derek Tipp, an outspoken conservative AGW dissenter from the United Kingdom, an opportunity to reassert his oft-repeated claim that volcanic CO_2 vastly exceeds fossil CO_2. This is quite simply not true. As vulcanologist Terry Gerlach

explains in a highly readable article published by the American Geophysical Union (Gerlach 2011), anthropogenic CO_2 emissions total more than 30 Gt (gigatons) per year; volcanic ones typically measure a mere 0.25 Gt.

Airliners were not endangered by Eyjafjallajökull's minuscule CO_2 emission but by the potential clogging of their engines by ash, which was carried by prevailing winds into busy air corridors. All volcanic eruptions release sulfur dioxide (SO_2) into the upper atmosphere as well as ash. Here it reflects some of the sun's rays, later falling to the ground in the form of raindrops laced with sulfuric acid (acid rain). So not only does volcanic activity not heat the world, it cools it, at least until the SO_2 and ashes have both been rained out.

Eyjafjallajökull's global cooling effect was small. Pinatubo's, in the Philippines in 1991, was not: it produced a global temperature drop averaging about 0.3° C, which persisted through 1992 (USGS n.d.). While Tipp claims that Pinatubo "spewed out more greenhouse gases into the atmosphere than the entire human race had emitted in its entire YEARS on earth," he is strangely silent on the 1815 Tambora, Indonesia, eruption (USGS n.d.). This, the most dramatic volcanic event in recorded history, cooled some parts of the globe by more than 3° C and caused Europe and North America to experience in 1816 what came to be known as the year without a summer.

Nothing New Here

"Climate has always been changing and will continue to change forever. This 'Global Warming' scam will go down in history as just another example of how easy it is to fool most of the people most of the time."

This anonymous critic of a January 2014 *Cape Breton Post* article on global warming apparently doesn't realize that the very fact that climate is always changing destroys his own argument. Droughts, floods, famines, etc., induced by climate change have been identified as the culprit in the decline, and sometimes the extinction, of many ancient civilizations (Fagan 2004). Those events were usually regional or local, and were not foreseeable by their victims. The present one is different: we can see it coming, it is global, and it is faster and bigger than any that has occurred for many thousands of years.

Far Too Little Fossil Fuel CO_2 to Affect Climate

"As a percentage of the atmosphere, CO_2 is up a mere 69.59 parts per million since 1959" (Mulshine 2009).

The idea that the change in atmospheric CO_2 since preindustrial times is far too small to cause large-scale climatic effects is widely advertised as a killer argument against AGW. Observation and experiment, however, teach us just the opposite. To keep its temperature constant, Earth must radiate into space the same quantity of heat as it receives from the sun each second. Laboratory studies first made about 150 years ago show that the oxygen and nitrogen, which respectively comprise 21 percent and 78 percent of the atmosphere, are almost transparent to this outgoing infrared radiation, but that the CO_2 component, even at its 280 ppm preindustrial level, absorbs a sizable fraction of the heat radiated from the surface within the first 10–20 m.[1] Without these 280 ppm, the preindustrial world would consequently have been some 10° C colder than it in fact was. In this context, quoting its level as a percentage of the total atmosphere is quite meaningless. Furthermore, the present warming trend did not start in 1959 but at the beginning of the industrial revolution, and since the CO_2 component of the atmosphere is now 400 ppm it is up 43 percent, not the *Star Ledger* journalist's "mere" 69.59 ppm.

Not only does volcanic activity not heat the world, it cools it, at least until the SO_2 and ashes have both been rained out.

It's Only a Few Measly Degrees Anyway

"Global Warming? Somebody tell this man why a few degrees of extra warmth are bad!" (Catholic Online 2013).

The man in question is Gov. Paul LePage (R.–Maine). A few degrees may not sound like much when day-to-day, even hour-to-hour temperature fluctuations of a few degrees at a given place go almost unnoticed. Why, then, asks the governor, are we trying—without conspicuous success—to keep global warming below 2° C when that extra warmth sounds like good news?

The weakness of this argument is that short-term changes in local weather are useless for putting long-term, global, climatic ones in context. A much more reliable yardstick is the change, clearly archived in Antarctic and Greenland ice cores, that marked the end of the last ice age. This climatic event literally redrew the map of Europe, North America, and elsewhere by melting millions of square kilometers of ice sheets and raising the global average sea level by something like 100 meters. Yet the ice core record shows that these changes resulted from an average global temperature rise[2] of only 5° C.

Nevertheless, we survived. Would we even notice the one meter rise in sea level and the 3° C temperature change predicted by 2100 for the "business as usual" scenario of Intergovernmental Panel on Climate Change (IPCC)? First, only a few million people were around in 10,000 BC to experience the consequences of that change, and those who were could move without much hindrance if they didn't like the way

things were going. Now there are 7 billion of us, many living in populous cities near or below sea level. Still more live in low-lying areas of countries like Bangladesh and the Netherlands and in parts of the United States like Florida and Louisiana. A one-meter sea level rise would oblige many of these people to move. We read stories almost daily about the difficulties associated with present-day population movements. If migration at this level is such a big problem, our tightly interconnected world will face far worse ones by 2100.

Rejecting climate models' results out of hand as unverified and oversimplified is a bit like treating the laws of nature as some kind of optional extra that you can ignore if you don't like the conclusions they lead to.

Sneaky Activists Changed 'Global Warming' to 'Climate Change'

"The terminology in the upcoming environmental debate needs refinement. . . . It's time for us to start talking about 'climate change' instead of 'global warming.' . . . While global warming has catastrophic connotations to it, climate change suggests a more controllable and less emotional challenge . . ." (Luntz 2002).

The above comes from a strategy document submitted to the Bush administration in 2002 by Frank Luntz, a prominent Republican strategist. AGW deniers nevertheless insist that it was global warming activists and not the political establishment of the time that replaced the term *global warming* by *climate change*, when they realized that their climate projections were all wrong. Since climate change can mean lower as well as higher temperatures, they would then be covering themselves against the possibility of the planet getting cooler instead of warmer. In fact the two terms were used interchangeably until about 1998 when the IPCC settled upon the latter, apparently at the insistence of oil-producing countries and the United States (Poole 2007).

Melting Ice Cannot Raise Sea-Level

"If you have a glass of water with ice cubes in it, as the ice melts, it simply turns to liquid and the water level in the glass remains the same . . . (so that) *even if polar ice caps melted, there would be no rise in ocean levels."*

This proclamation, made by Rush Limbaugh on a June 1992 radio talk show, has had a long shelf-life. It is correct for ice cubes already floating in a glass, and for the *arctic* ice cap, which is also afloat.[3] However, *adding* ice cubes to the glass will clearly change the water level. This is the situation for ice melts in Greenland and Antarctica, where kilometers-thick layers of ice aren't floating in the sea but are anchored to the underlying land masses. As for the added ice cubes, the ice doesn't even have to melt: if part of it becomes detached from the main mass and slides into the ocean, it will displace the same amount of water as if it had first melted and then run off.

At the moment global sea level increases by about 3mm per year. Most of this comes from thermal expansion of the oceans as the temperature goes up. The contribution from melting ice is small; it would dominate only if Greenland and Antarctic ice melts took off in a big way.

It's Just Computer Models . . .

"The greenhouse fearmongers rely on unverified, crudely oversimplified models to finger mankind's sinful contribution . . ." (Cockburn 2007).

The late Alexander Cockburn was a frequent contributor to *The Nation*, where he was famous for the "take no prisoners" style of his usually left-leaning writings. Global climate, or General Circulation Models (GCMs) apply the laws of nature (Newton's laws of motion, the laws of thermodynamics, etc.) to calculate the time evolution of the atmosphere, the oceans, the polar ice, etc., under the influence of natural phenomena like volcanoes and solar variation, as well as human activities like fossil fuel burning and cement production. GCMs are not perfect, notably in the area of cloud formation, but they are constantly being refined as more and better data, faster computers, and improved computational techniques become available. Rejecting their results out of hand as unverified and oversimplified is a bit like treating the laws of nature as some kind of optional extra that you can ignore if you don't like the conclusions they lead to.

Calculations need input data. These are not just made up; they come from present and past measurements of temperatures, ocean salinity, fossil fuel consumption, and so on. And of course scientists are well aware of the garbage in-garbage out effect. Several such models developed by different research groups around the world reproduce well the observed pattern of rising temperature since the beginning of the industrial revolution. Furthermore, when they are run with the anthropogenic part taken out, this "good fit" to the observed pattern becomes a very bad one. Assumptions about future fossil fuel consumption can be included in the data, and this is where the predictive value of GCMs comes in, and much of the uncertainty.

Uncertainty ? So You Can't Trust the Models . . .

"Should the public come to believe that

the scientific issues are settled, their views about global warming will change accordingly. . . . You need to continue to make the lack of scientific certainty a primary issue in the debate" (Luntz 2002).

Luntz was here effectively advising George W. Bush to accept nothing short of absolute certainty in projections of future climate. Yet no measurement can be made with infinite precision, and much of the art involved in observation and experiment lies in estimating margins of error and refining techniques to reduce them as far as possible. The fact that the several independent GCMs in existence cross-check within their estimated margins of error is robust evidence that they are basically correct. To most nonscientists, however, the words *error* and *mistake* are synonymous. So Luntz is arguing that honestly admitting that global warming science can never be absolutely right is admitting it is just plain wrong.

Exhaled CO_2 Exceeds Fossil Fuel Emissions

"I exhale carbon dioxide. I don't want those guys following me around with a meter to see if I'm breathing too hard" (Romney 2011).

We inhale about four liters of CO_2 per day but exhale about 350 liters. If we didn't do this we would die, as this additional CO_2 is a waste product of our metabolism. Annual CO_2 exhalations from humans and animals amount to a few Gt, so even if it were necessary to include breathing among the global warming culprits, its contribution would be small compared to the 30 Gt anthropogenic total. However, we need not, in fact should not, take exhaled CO_2 into account, since the additional 346 litres is just what we absorbed from the grains, fruits, vegetables, etc., in our diet, and was itself absorbed by these foodstuffs from the atmosphere when they were growing. Since anabolic processes in our food animals convert dietary plant material into tissue, meat eating accounts for part of the 346 liter total. CO_2 exhaled by both animal and human life simply goes back into the environment as part of a closed cycle.

Conclusion

The individuals quoted above were doubtless expressing honestly held opinions. Belief is, however, no guarantee against being wrong. Most of their factoids are indeed long-dead horses, still being flogged as sure-fire winners in arguments against climate science. While not all AGW critics make such errors, those who do often make the most noise, so their factoids go viral all the more quickly. And they are certainly not alone in falling into the factoid trap—some environmentalists with strong opinions on the topic can and do fall into it too.

One last factoid will be especially annoying to SI readers: the claim that skeptics in the CSI sense are not real skeptics about global warming because they don't categorically reject claims made by the thousands of scientists worldwide who spend their entire careers doing climate research. This charge has frequently been leveled at the Skepticalscience.com website, http://www.skepticalscience.com/fixednum.php, which addresses many more factoids than space permits in an article such as this one. There is no adequate defense to this allegation except perhaps to remind offenders politely of the wise words of Sir Walter Raleigh: "The Skeptick doth neither affirm nor deny any position, but doubteth of it, and opposeth his Reason against that which is affirmed or denied to justify his non-consenting."

Or maybe not. He got his head chopped off. ■

Notes

1. CO_2 absorbs heat most efficiently just where the earth radiates it most strongly, at wavelengths around 14–16 micrometers. The absorption length goes up with increasing altitude, down with increasing CO_2. The figure quoted is an approximate sea level average.

2. The average temperature rise inferred for the polar regions some 12,000 years ago is about 9° C. Then, as now, this was about twice the global average.

3. Briny seawater is denser than the pure water ice formed in it. Consequently, melting sea ice does raise the level by a small amount.

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Remembrance of Apocalypse Past

The Psychology of True Believers When Nothing Happens

Research on belief in the 2012 "apocalypse" demonstrates that specific psychological processes contributed directly to the maintenance of paranormal apocalyptic beliefs, even after the apocalypse did not occur.

MATTHEW J. SHARPS, SCHUYLER W. LIAO, AND MEGAN R. HERRERA

As is fairly obvious by now, the much-heralded end of the world in 2012 didn't happen. Quetzalcoatl didn't return on his raft of snakes. The earth was not torn asunder. Alien overlords did not materialize. It didn't even rain very much that week.

We were privileged to publish an article in the Skeptical Inquirer last year (Sharps et al. 2013) concerning the psychological factors that made it possible for modern human beings, even with modern access to scientific information, to believe in this type of baseless nonsense. We found that disturbingly high numbers of university students either believed in or entertained the likelihood of the "Mayan end of the world." We found curious incoherencies in their patterns of belief: for example, many believers in the Maya "prophecies" *did not believe in what those prophecies predicted*. The idea expressed is completely illogical, but this illogical incoherency was in the minds of a great many people who were attempting to think about the 2012 apocalypse before it didn't happen. Whether the believers expected world peace and a new age, or world destruction and apocalyptic doom, logical inconsistency was very commonly observed.

This type of incoherency didn't die with the nonexistent apocalypse; it's still there, ready and waiting, in the minds of enormous numbers of True Believers.

Dissociation, Imagination, and the Supernatural

Dissociation, at a subclinical level, played a big part in our 2013 results. Those who exhibited dissociative tendencies exhibited a higher level of supernatural credulity in the belief that the Mayan apocalypse would actually occur.

It is important to note what is meant by the term *dissociation* in this context. We emphatically do *not* refer to psychiatric concepts of dissociative identity disorder, or to a pathological level of dissociation in which psychotic ideation might occur. We refer to *subclinical* dissociative tendencies, of the sort probably experienced from time to time by most people. This type of dissociation may lead to a diminished critical assessment of reality. As discussed in earlier Skeptical Inquirer articles (Sharps 2012; Sharps et al. 2013), there may be anomalous perceptions of individual experience. The world may appear to be "not quite real or… diffuse" (Cardena 1997, 400). This is emphatically *not* "mental illness." However, the disconnection with immediate physical reality that occurs with subclinical dissociation might incline many normal people to view highly improbable things with enhanced credulity (see DePrince and Freyd 1999).

In previous work (Sharps et al. 2006; Sharps et al. 2010), including previous articles in the Skeptical Inquirer (Sharps 2012; Sharps et al. 2013), we addressed the role of dissociation in paranormal beliefs. We found that dissociation is associated with beliefs in ghosts, aliens, and "cryptids" such as Bigfoot, and that the subclinically dissociated are actually more likely to *see* these things, to interpret ambiguous stimuli as paranormal in nature. Where others see a hoax, those with dissociative tendencies see a flying saucer or the Loch Ness monster. Such subclinical dissociation is very important in producing and maintaining the credulous viewpoints involved in paranormal thinking.

Seeing the Supernatural

Credulous viewpoints, dissociated or not, are neither new nor rare. Humans have a long history of predicting our own doom, especially when that doom can be linked, however loosely, to the heavens. People see all sorts of things in the night sky, following which they tend to imbue them with supernatural significance. The Anglo-Saxon Chronicle for the year 793 (Ackroyd 2011, 63) records that the beginning of the Viking Age was heralded by immense lightning flashes (maybe so), and by fiery dragons flying in the sky (probably not). Lightning is of course dangerous, but it has a lot more to do with atmospheric electricity than with angry Norwegians storming ashore in Lindisfarne. As to the Chronicle's dragons, well, people tend to create *meaning* in the things they seen in the sky, turning atmospheric abstractions into meaningful (and scary) images. For example, in 1528, the surgeon Ambrose Pare saw an aerial blood-col-

ored human arm holding a sword, surrounded by axes, knives, and evil faces (Connell 2001). Obviously a portent, but equally obviously, such a thing could not actually exist in the sky.

What did Pare actually see? With the passage of time, it's impossible to be sure, but previous research (Sharps et al. 2009) showed that eyewitness errors *of the imagination*, in which reported features of a given scene have no existence outside the mind of the given witness, *are in fact the norm* rather than rare anomalies. We suspect that the good surgeon's imagination got hold of a cloud, or a distant storm, and then went a bit too far.

Or perhaps he saw a comet or a meteor shower; those things *really* turn on the imagination. In 1095, Bishop Gislebert of Lisieux interpreted a meteor shower as a go-code from God for what would become the First Crusade. In 1664, on beholding a comet, Alphonsus VI of Portugal ran through the night threatening the thing with a pistol; and in 1773, when Halley's Comet turned up, clergymen sold tickets for seats in Paradise for the date on which the world was supposed to end. Who was supposed to *take* the tickets was never made clear, but this apocalyptic nonsense goes on and on, from age to age (Connell 2001).

Our current age is no exception. The mass suicide of the Heaven's Gate movement (e.g., Vick 1997), in which believers planned to depart Earth in a UFO apparently hiding behind Comet Hale-Bopp, and the Y2K phenomenon (e.g., Nolte 2009), in which many people believed that Ragnarok was going to hit because all the computers were going to stop working for no adequately explored reason, provide additional examples. In our modern world, apocalyptic and supernatural thinking are alive and well.

One might think that compulsory education would cure this sort of thing, but that is not the case. Research has shown that college students frequently engage in supernatural behaviors in their examinations, especially when the consequences are perceived as particularly important (Rudski and Edwards 2007). In our work on the Mayan apocalypse, mentioned earlier (Sharps et al. 2013) 45.6 percent of these relatively educated people thought that world-changing events might very well occur at that time, and 9.8 percent were fairly sure that cosmic doom was imminent.

So, our research told us that before the Mayan non-event of 2012, a frighteningly large proportion of the population entertained the magical thinking involved in apocalyptic prophecies. We also knew that definable cognitive incoherencies were involved, and we knew that individuals with subclinical dissociative tendencies (SDTs) were more likely to believe the pseudoscientific hype.

But what would happen, psychologically, to the True Believers when Quetzalcoatl et al. failed to turn up and life went on as usual?

After the Ball Is Over

Prior to the 2012 lack of apocalypse we had decided to conduct studies both before and after the relevant date. However, as we began to collect data on this second half of the project, we experienced a kind of collective intellectual doubt. After all, it wasn't going to be very interesting. We *knew* what we were going to find: those who originally believed in doomsday would obviously disclaim these beliefs afterward, dissociative tendencies or not. It seemed hardly worth our time to complete the study.

We were absolutely, and amazingly, wrong.

Background to Apocalypse When There Isn't One

In 1956, Festinger, Riecken, and Schacter published a fascinating study of a splinter group who believed in an earlier version of the ever-recurrent apocalypse. This particular bunch of True Believers, led by a lapsed Scientologist named Keech, gave up their jobs, spouses, and assorted other valuable aspects of life for the opportunity to fly with obliging aliens, in a literal flying saucer, to the entirely fictional planet of Clarion. Boarding was to commence at midnight on December 20, 1954, in time to avoid an enormous flood that was scheduled to destroy the rest of the world. The Believers gathered together.

Nothing happened.

Everybody sat there for about four hours. Keech started to cry.

Forty-five minutes later, Keech got a call (by "automatic writing") from God, who had decided not to kill everybody for divine reasons, mainly be-

cause Keech's followers had in fact been so amazingly wonderful in, well, sitting around waiting for nonexistent aliens at the boarding gate.

Now, you wouldn't expect that anybody over the age of six would be fooled by a cobbled-together last-minute desperate mess like this, but apparently Keech's devotees bought it. They began to proselytize *even more than they had before their promised event had failed to materialize*.

Festinger and his colleagues used this deplorable incident as the basis for their important research on *cognitive dissonance*.

Cognitive Dissonance and the End of the World

Cognitive dissonance basically comes down to the following fact: the more you pay, the better you like. In other words, if I make a substantial investment in anything, whether financial or emotional, in a business, an attitude, or an idea, I am more likely to place a high value, and consequently a high resistance to rejection, on that investment. A full discussion of this concept is provided in an earlier Skeptical Inquirer article (Sharps 2014).

This phenomenon was strongly demonstrated in the realm of apocalyptic thinking by Festinger and colleagues (1956), as mentioned. Even though nothing happened on the fateless night of December 20, 1954, Festinger et al. found that many True Believers in Keech's end of the world not only retained their previous beliefs, but in fact were galvanized in those beliefs by the *failure* of the apocalypse. Their faith, they believed, had staved off disaster for the present, but the inevitability of the end of the world was actually, and paradoxically, *reinforced* for these people. Cognitive dissonance provided an *enhancement* of their deluded beliefs, *even in the absence of any real-world evidence that these beliefs might be correct*.

The Modern World

In 2012, we were repeatedly told by many media stories that the world would end on December 21 of that year. It was suggested that this was predicted by the Maya, given that this date coincides with the end of a calendrical cycle, a *baktun*, within their "long count." This date was also suggested to coincide with a "galactic alignment," a phenomenon that had less to do with astronomy than it did with vague nomenclature concerning what actually constitutes, in cosmic terms, a line (e.g., Krupp 2009). Even if such an alignment were a scientific reality, it would have no earthly significance; and anyway, there is at least one Maya document that mentions December 21, 2012, without any apocalyptic significance at all (Bower 2012). In 2014, we're coming up on the sixtieth anniversary of the aborted trip to Clarion in 1954, and on Festinger's classic study of 1956. Has there been no advance, in over half a century, in appropriate scientific skepticism that would defeat cognitive dissonance and result in a rational acceptance of the facts in the wake of yet another failed apocalypse?

Has there been no advance, in over half a century, in appropriate scientific skepticism that would defeat cognitive dissonance and result in a rational acceptance of the facts in the wake of yet another failed apocalypse?

The answer is not reassuring.

The Present Research

One hundred and four college students at a California university completed several surveys in which they were asked to rate the degree of their earlier belief, *after the fact*, that major world changes were going to happen on December 21, 2012. They were also asked about the sources of this belief, and about their specific beliefs concerning what, precisely, was supposed to happen on that date. Subclinical dissociative tendencies of the given respondents were measured by means of the standard Dissociative Experiences Survey (Carlson and Putnam 1986).

The respondents in this research, college students, continually engage in critical thinking and the scientific evaluation of information. Even so, this population gave evidence of unexpected levels of credulity in the case of the 2012 apocalypse.

In our research prior to the non-apocalypse, 44.6 percent stated that they anticipated no major changes on 12/21/12, or that such changes would be very unlikely. In our present research, 23 percent stated that they had believed in, or at least entertained, the end of the world on this date—in other words, about half of those who had believed *before* the date were willing to admit these beliefs. Eleven out of the 104 respondents, 10.6 percent, *believed that this apocalyptic event was still going to happen*. This is very close to the 9.8 percent who were certain, before the fact, of the apocalypse (Sharps et al. 2013).

Festinger et al.'s 1956 cognitive dissonance concept is the most parsimonious explanation of this result; about one in ten people were evidently unable to overcome their psychological investment in the 2012 phenomenon. But what were the cognitive mechanisms underlying this investment, so strongly held that it kept operating in the face of a non-apocalyptic reality?

Dissociative Tendencies

Dissociation continued to play an important role here. There was some good news: dissociation was not statistically important for the continuation of the overall belief in the 2012 end of the world. Nor was there a relationship between dissociation and belief that major physical changes, social changes, extraterrestrial aliens, global warming, or climate change would herald the end. The Christian apocalypse, in which Jesus Christ is expected to

return at the end of the world, was also not endorsed by those with dissociative tendencies. These null results were entirely consistent with our previous work before the December 21 date (Sharps et al. 2013).

However, there was a relationship (R^2 = .065, F [2,101] = 3.51, p = .034, β = .248) between SDTs and belief in the return of Kukulcan (Quetzalcoatl), the Mayan god anticipated in this particular apocalypse. Belief in the Mayan prophecies, with relation to SDTs, also remained significant, R^2 = .101, F (3,101) = 5.68, p = .005, β = .377. Finally, and oddly, SDTs were significantly associated with belief that "computer simulations" predicted the apocalypse (R^2 = .052, F [1,102] = 5.60, p = .020, β = .228), despite the fact that *there were no such computer simulations at all.*

How can this pattern of results be explained?

Gestalt and Feature-Intensive Processes

Previously (Sharps 2003; Sharps 2010; Sharps et al. 2013; Sharps and Nunes 2002), we presented a continuum in human information processing, in what is called Gestalt/Feature-Intensive (G/FI) Processing theory. This continuum ranges from *feature-intensive* processing, in which the specific details of a concept are given specific consideration, to *gestalt* processing, in which a concept is considered without detailed analysis, with relatively uncritical acceptance of the given idea as a whole.

We suggest here a relationship between dissociative tendencies and gestalt, relatively uncritical, processing. In 2012, enormous attention was given to the Maya prophecies. This, according to the *availability heuristic* of Tversky and Kahneman (1973), made these prophecies relatively salient to the entire population.

However, for most people, there would have been some feature-intensive consideration of these prophecies; ancient societies lacked modern scientific understanding, and so their prophecies might not be right. However, those exhibiting subclinical levels of dissociation, with consequent gestalt processing tendencies, would not engage in such feature-intensive thinking, and thereby would credulously entertain the Mayan "prophecies."

Now, modern people in the West, in general, have more knowledge of Christian ideas than they do of ancient Mayan beliefs. Therefore, a relatively feature-intensive analysis of the Christian intellectual realm is culturally forced upon us, even upon those with dissociative tendencies. So, the dissociated did not endorse the return of Jesus Christ as associated with the 2012 apocalypse. However, most of us know little of Mayan arcana. Mayan concepts are therefore necessarily less feature-intensive, and consequently more gestalt, for the vast majority of us; but, for most of us, this absence of detail does not result in credulity. For those with SDTs, however, this gestalt processing of an ancient culture's supposed precognition was sufficient to generate belief.

For human beings, the world consists of a blend of objective reality and of our subjective interpretations of that reality; it is that subjective interpretation that is most subject to the salutary influence of education.

This hypothesis was further supported by the association of SDTs with belief in "computer predictions" of the end. Most of us, although we use computers extensively, are unfamiliar with their inner workings. Computer operations are ubiquitous (hence cognitively available as gestalts; Tversky and Kahneman 1973), and they seem terribly scientific; thus, in the SDT-related absence of feature-intensive consideration in favor of less-specific gestalt thinking, they might be assumed to be prophetic, accurate in their predictions. The fact that there were no such computer simulations may not have mattered to the subclinically dissociated; after all, to understand this would require the very type of feature-intensive thinking that is reduced in the presence of SDTs.

More specific, feature-intensive concepts such as climate change were not endorsed. This was consistent with the tendency of subclinical dissociation to reduce feature-intensive analysis (e.g., Sharps et al. 2006; Sharps 2010).

In Summary

So, four psychological factors contributed to continued belief in the 2012 apocalypse: cognitive dissonance; dissociative tendencies; gestalt processing; and conceptual availability, as suggested by Tversky and Kahneman (1973).

In the case of the 2012 Mayan apocalypse, an appreciable fraction of the population, about 10 percent, believed that the failed apocalypse was still to occur. The most parsimonious explanation of this rather incredible result lies in *cognitive dissonance*, the influence of psychological investment.

Who held most strongly to that investment? Those with subclinical *dissociative tendencies*, which enhanced credulity through the reduction of feature-intensive analysis in favor of *gestalt consideration*. This, in turn, reduced consideration of the details that might attenuate beliefs in the supernatural. These beliefs were further guided by the *availability heuristic* of Tversky and Kahneman, by the relative availability of such concepts as Mayan prophecies and computer simulations in media.

This four-point model is our best explanation of the belief in such bizarre concepts as the Mayan end of the world, and probably in other paranormal conceptions (Sharps 2012; Sharps et al., 2006; Sharps et al. 2010). These results provide a scientifically coherent explanation of current beliefs, even after the fact, in the 2012 apocalypse.

How do we counter these influences?

The answer is obvious. We need better education in science, in feature-intensive consideration of facts, and in the ability to analyze paranormal claims in terms of their specific details. For human beings, the world consists of a blend of objective reality and of our subjective interpretations of that reality; it is that subjective interpretation that is most subject to the salutary influence of education.

Of course, this is hardly a novel concept. Plato called for essentially the same precision well over two thousand years ago (e.g., Cornford 1957). Socrates was killed by fellow Athenians in large part for insisting on this level of feature-intensive analysis. It is to be hoped that our modern world will be less draconian in the defense of its irrational paranormal beliefs.

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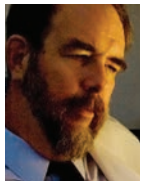

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STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION (Required by 39 U.S.C. 3685)

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The Great Freethinker We Owe A Big Debt

KENDRICK FRAZIER

He was the preeminent American orator of his era.

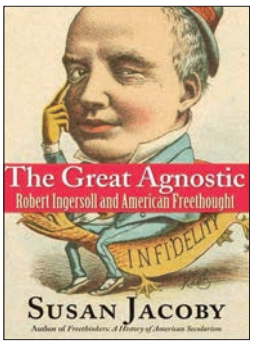
His public appearances throughout the United States were major events and popular sell-outs. Thousands flocked to them. Tickets became a prize for scalpers.

He and Thomas Paine were America's best-known defenders of reason and secular government.

He was an even more effective defender and explainer of Darwin's then-new theory of evolution by natural selection than Darwin's famous biologist "bulldog," Thomas Henry Huxley.

The nation's foremost agnostic and freethinker of the nineteenth century, Robert Green Ingersoll (1833–1899) electrified audiences and made freethought and scientific, anti-superstitious thinking appealing and respectable to vast segments of the public in ways hard to envision achieving even today.

Yet he is now little known, at least outside the secular humanist community. Scientific skeptics are nearly as unaware and unappreciative of his formidable contributions to the public understanding of science and reason in the last quarter of the nineteenth century as is most of the populace. I knew of him mainly through my association with the Council for Secular Humanism (CSH). CSH operates the newly refurbished Robert Green Ingersoll Birthplace Museum in Dresden, New York (and offered a sold-out immersive two-day conference on Ingersoll near there in August, with Jacoby as a speaker). The museum's video about Ingersoll is aptly titled "Meet the Most Remarkable American Most People Never Heard Of."



The Great Agnostic: Robert Ingersoll and American Freethought. By Susan Jacoby. Yale University Press. 2013. ISBN 978-0-300-13725-5. 146 pp. Paperback, $15.00.

Susan Jacoby's short and lively biography of Ingersoll sets out to correct that situation, and in my mind succeeds admirably. Science-oriented skeptics would do well to read it to better understand how Ingersoll achieved such extraordinary popularity while advancing freethought, agnosticism, science, and strict separation of church and state—still not easy sells today.

But Ingersoll, like his hero Abraham Lincoln, was a self-educated lawyer with a common touch. His lively mind and exceptional gifts of communication made him a master of reaching regular, small-town, heart-of-America people and those who might otherwise disagree with his message. He used everyday language and wit and never spoke condescendingly (although he could be acerbic toward ideas he found laughable). Even when his audiences disagreed with him they left entertained and with respect for him.

Though widely known as "The Great Agnostic," Ingersoll didn't care whether people labeled him an agnostic or atheist. He happily accepted either term, thus defusing an issue that ties so many thinkers today up in knots.

Jacoby (author of such earlier books as *Freethinkers* and *The Age of American Unreason*) doesn't engage in many analogies or modern-day comparisons, but I can't help doing so. It seems to me that in Ingersoll we had a combination of Paul Kurtz's high-level philosophical advocacy of a unitary brand of affirmative humanism, separation of religion

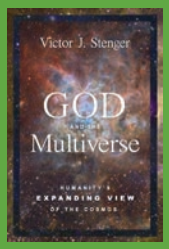
Ingersoll's lively mind and exceptional gifts of communication made him a master of reaching regular, small-town, heart-of-America people.

from government, and science-and-evidence-based thinking and, say, Carl Sagan's unmatched populist ability to appeal to the widest possible audiences with powerful, positive messages of reason and science.

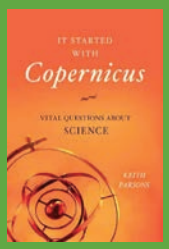
But this was a less cynical age. In many ways it was a time of great progress, and Americans were relatively receptive to new ideas and ways of think-

[NEW AND NOTABLE

Listing does not preclude future review.



GOD AND THE MULTIVERSE: Humanity's Expanding View of the Cosmos. Victor J. Stenger. The noted physicist and writer (who died August 27, 2014, just before this book's publication date) follows up on his recent books *God and the Atom* and *The Fallacy of Fine-Tuning* with this timely exploration of how the current picture of our vast universe and the real possibility of multiple universes developed. He also examines how the ancient notion of a supernatural creation arose to explain what eventually became explicable through purely natural processes. Along the way, Stenger covers everything from "From Myth to Science" to a series of final chapters on cosmic inflation, "Falling Up" (neutrino mass, dark matter, dark energy, etc.), the newest discoveries modeling the universe (Planck satellite results, gravitational waves, etc.), "The Eternal Multiverse," and "Life and God" (planets and life, parameters needed for life, the case against fine-tuning, the "grand accident," and the God hypothesis). Prometheus Books, 2014, 428 pp., $26.



IT STARTED WITH COPERNICUS: Vital Questions About Science. Keith Parsons. A unique approach to the philosophy of science, this book attempts no comprehensive review of the entire field but instead selects some of the most vibrant debates and issues. Among them: Is science more rational or objective than any other intellectual endeavor? Are scientific theories accurate depictions of reality or just useful devices? Should science address questions traditionally reserved for philosophy and religion? Does science leave room for human values, free will, and moral responsibility? What about the academic left's radical critiques of scientific rationality in the 1990s? Parsons, a philosophy professor who wants to engage readers who aren't specialists, eschews textbooks' guardedly neutral tone and here forthrightly offers his critiques and assessments of these and other topical issues. Prometheus Books, 2014, 350 pp., $19.95.

MYSTERIOUS NEW MEXICO: Miracles, Magic, and Monsters in the Land of Enchantment. Benjamin Radford. In a state of vibrant contrasts, including both scientific and mystical traditions, Radford (SI's deputy editor and research fellow) offers the first book to apply scientific investigation methods to explain some of New Mexico's most bizarre

ing. It was, as Jacoby says, "a fertile environment in which Ingersoll preached the gospel of science as the major source of human progress and religious superstition as its enemy" (p. 79).

In a chapter titled "A Champion of Science," Jacoby shows that Ingersoll's lectures were infused with the conviction that scientists and inventors had done more for society than preachers of any creed. The frontispiece of the first edition of his collected works (twelve volumes!) features a cartoon embodying this theme. A row of crosses is marked "For the love of god." In another row the crosses are now actually telephone poles and the slogan is "For the use of man."

Ingersoll's stirring defenses of the new idea of evolution were effective not just because he could explain complex scientific topics in clear language but also because he acknowledged people's uneasiness with the idea that we were descended from lower forms of life. He too, he admitted, at first shared their unease, their shock that we are only a part of nature. But, he added (in just one tiny excerpt from a long, oratorical passage), ". . . I would rather belong to that race that commenced a skullless vertebrate and produced Shakespeare . . ., and have that hope, than to have sprung from a perfect pair upon which the Lord has lost money every moment from that day to this" (84). This optimistic message was well suited to Americans of that time.

Ingersoll refuted the intelligent design argument of the time, William Paley's argument that a watch had to have a watchmaker, and mocked religious believers' tendency (which is just as prevalent today) to attribute everything good and beautiful to a divine creator and everything bad and evil either to the devil or a mysterious divine plan beyond human understanding.

Ingersoll loved to quote Darwin's now-famous final passage beginning "There is grandeur in this view of life. . . ." He found it more inspiring than anything in the Bible, with the additional advantage that it did not require a repudiation of nature.

He also explained the true value and meaning of science as a system of inquiry with tentative conclusions always open to new evidence. In Jacoby's judgment, he explained this more understandably than any scientist of his time, even the brilliant popularizer Huxley, and "in more lucid fashion than any scientist, with the possible exception of [Richard] Dawkins, is doing now" (p. 198).

Jacoby follows her biographical chapters with a pungent afterword, "A Letter to the New Atheists," challenging today's thinkers and writers to more openly acknowledge their debt to Ingersoll. "There is no such thing as a new atheist. You know this of course." She notes that they are quick to acknowledge Copernicus, Galileo, Bruno, Voltaire, Spinoza, Paine, Humboldt, and of course Darwin. "So why is Robert Green Ingersoll usually absent from your honor roll?" It is a good question.

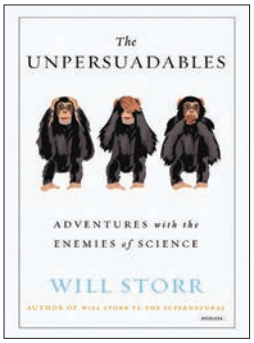
"You 'new' atheists should consider it your special duty and privilege to work tenaciously for the restoration of the memory of this old American freethinker. You owe him. So does every American, religious or nonreligious, who enjoys and takes for granted that liberty of conscience is meant for thee as well as for me—the greatest secular idea of all."

Likewise, I think scientific skeptics of all stripes should become more aware of Ingersoll and gain a deeper appreciation of his extraordinary contributions forging the way to public acceptance of scientific ideas and reason. We all owe him.

Kendrick Frazier is editor of the SKEPTICAL INQUIRER.

A Walk on the Other Side

DANIEL GRASSAM



The Unpersuadables: Adventures with the Enemies of Science. By Will Storr, The Overlook Press, New York, 2014. ISBN 978-1468309812. 416 pages. Hardcover, $27.95.

If you have ever wondered what it would be like to go to past-life regression therapy, spend seven days in silent Buddhist meditation, or take a tour of German concentration camps with the world's foremost holocaust denier, wonder no longer. You can experience these things and more from the comfort of your favorite reading chair. Will Storr, an award-winning journalist, has done all these things and more and written a firsthand account of his experiences in *The Unpersuadables: Adventures with the Enemies of Science*.

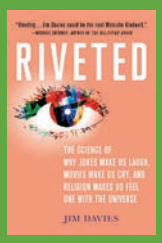
Storr's approach is to get up close and personal with those who ignore or reject mainstream science, speaking directly with some of the biggest names in these fields. On occasion he becomes an active participant. One of the first stories he relates is taking part in a six-day yoga event run by Swami Ramdev. Storr's commentary on the location, the multiple levels of access pass (nine in total), and the adjutants who ensure everyone remains in their places give us a sense of being there. "I spend the next five days rising in the darkness, picking my way to my small square of tartan . . . doing my breathing exercises and feeling exactly as 'amazing' as you might expect after three hours of pre-dawn nose yoga and speeches delivered in Hindi by a man sitting very far away." Only five days of the event were analyzed because Storr was barred from attending the sixth. It seems that in his interview with Ramdev he asked questions he shouldn't have in relation to some of Swami Ramdev's incredible claims such as that breathing yoga can cure all diseases and Coca-Cola darkens the skin.

Storr asks asks himself why his mind wants to believe.

In addition to vivid descriptions of the events and people he meets, Storr narrates his personal thoughts and feelings about the experiences. Though at times the reader may think he has shared a little too much of himself, his narration contributes to the feeling of being on an adventure. Storr freely admits it when he finds himself drawn to the nonscientific claims and even when he finds comfort and benefits in them. In these latter instances Storr questions his feelings. He asks himself why

lore and legends. He uses folklore, sociology, history, psychology, forensic science, and good-old detective work to resolve thirteen mysteries that previous writers have merely wallowed in, including mysterious crystal skulls, the Aztec "UFO crash," the sacred soil of Chimayo, labyrinths, and several supposedly haunted public buildings. University of New Mexico Press, 2014, 312 pp., $24.95.

NEW ENGLAND'S SCARIEST STORIES AND URBAN LEGENDS. Summer Paradis and Cathy McManus. Two native New Englanders take the audience on a tour of mysterious and unexplained phenomena in the Northeast. Chapters include Vermont's Lake Champlain monster; the Gloucester sea serpent; fairy stories of Maine; the Dover, Delaware, demon; the Pigman of Northfield, Vermont; and a colorful collection of curses, legends, and other stories. Though largely free of any skepticism, the book is replete with color photographs, drawings, and interesting anecdotes. With a bibliography and an index, this slender book may be of use to skeptical researchers and will likely interest the public as well. Schiffer Publishing, 2014, 143 pp., $16.99.



RIVETED: The Science of Why Jokes Make Us Laugh, Movies Make Us Cry, and Religion Makes Us Feel One with the Universe. Jim Davies. Davies, a professor at the Institute of Cognitive Science of Carleton University, examines why humans are captivated by some things but left cold by others. Given the wide variety of stimuli in the world around us, how do we choose what to attend to and what to ignore? Davies argues that what we do and don't like to spend our time and cognitive energy on is largely determined by subconscious forces. Drawing from philosophy, psychology, biology, and other disciplines, the book explains our motivations for what we like and don't like. Palgrave Macmillan, 2014, 288 pp., $27.00.

—Kendrick Frazier and Benjamin Radford

his mind wants to believe. Unlike the practitioners he visits, Storr seeks his answers in science. This leads to discussions of the placebo effect and an entire chapter dedicated to how the brain's chemistry influences belief.

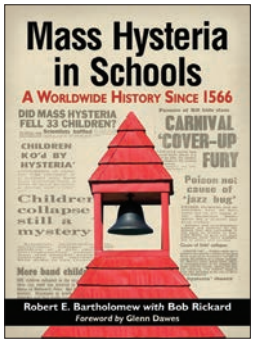
Storr doesn't just spend time with the credulous. He also attends a Skeptics in the Pub meeting during the 10:23 homeopathy overdose event. Storr admits to not identifying with the skeptics and was dismayed by the number he spoke to who dismissed homeopathy without having read for themselves any homeopathy studies. Storr also attended The Amazing Meeting in Las Vegas. The purpose of that visit was to interview James Randi. Owing to his unique place in the history of skepticism and the skeptical movement, Randi receives special attention in *The Unpersuadables*, getting an entire chapter dedicated to his life and exploits. Storr summarizes his description of Randi: "He is a record-breaking, toaster-inventing, hieroglyphics-reading, jail-cell-escaping, helicopter-dangling, crook-baiting, doctor-defying, fear-baiting certified genius," and follows this with, "no wonder they call him amazing." Despite this praise Storr doesn't spare Randi from the same direct questions that he puts to his other interviewees. He discusses the inconsistencies in stories told and statements Randi has made that have been shown to be false, asking Randi simply if he would "sometimes lie."

In addition to those subjects already mentioned, the book also covers creationists, UFO believers, Morgellons sufferers, climate-change denial, false-memories, voice-hearers, and ESP proponents. Through his storytelling Storr, who is a novelist as well as a journalist, puts a human face to those who are on the opposite side of the science. Though you may not agree with Storr's conclusion that if the "hard rationalists had their way" the monoculture it would create would be "a deathly thing," Storr tells a compelling story, one worth taking the time to read. ■

Daniel Grassam writes from his home in Auckland, New Zealand.

Reading, Writing, Math, and Panic in the Schools

BENJAMIN RADFORD


Mass Hysteria in Schools
A Worldwide History Since 1566
DID MASS HYSTERIA FELL 33 CHILDREN?
CARNIVAL 'COVER-UP FURY
Children collapse still a mystery
Robert E. Bartholomew with Bob Rickard
Foreword by Glenn Dawes

Mass Hysteria in Schools: A Worldwide History Since 1566. By Robert Bartholomew with Bob Rickard. McFarland & Company, Jefferson, North Carolina, 2014. ISBN: 9780786478880. 228 pp. Paperback, $40; Kindle, $18.75.

Mass sociogenic illness—better known as mass hysteria—happens in many situations all over the world but is especially prevalent in closed social units such as schools. They happen when people begin to experience symptoms of some apparently unknown (or even malevolent) cause, yet the true origin lies in psychology. Sociologist Robert Bartholomew has written extensively about mass hysteria in these pages (and, full disclosure, coauthored a 2013 book on media panics and hoaxes with me); Bob Rickard is a longtime researcher and founder of *Fortean Times* magazine. A better-suited pair to write about the subject would be hard to find.

Mass Hysteria in Schools covers an impressive variety of mass hysterias and panics, including outbreaks of demonic possession, twitching and shaking epidemics, itching frenzies, ghost panics, and mystery illnesses. To a layperson the topic may seem irrelevant or even comically obscure. However, in the book's introduction Bartholomew and Rickard note that mass hysteria in schools is a very real and serious issue:

> These accounts from around the world highlight the creative ways in which the human mind adapts to fear, uncertainty, and distress. From afar, outbreaks may seem to have no rhyme or reason, yet on closer inspection clear patterns emerge. Episodes are the outcomes of unique cultural contexts and fears. They are group problem-solving exercises that need to be recorded and understood. But beyond their fascinating storylines, they often have serious repercussions, for outbreaks are far more common than most realize and are impossible to eradicate. Each year the financial costs run in the tens of millions of dollars as schools in Western countries are forced to temporarily close while costly tests are conducted in a vain attempt to identify the cause of a mysterious odor or illness. When the results come back negative, the community is often thrown into social upheaval, as parents may keep their students away from school or even transfer them, under the belief that the mysterious triggering agent remains on the school grounds. Suspicion of a cover-up by public health authorities, who are seen as hiding the "real" cause, is common and may foster long-standing ill will between the community and the government. (p. 9)

Mass Hysteria in Schools has an encyclopedic, episodic feel, and though many of the cases are fundamentally similar, there is enough detail and variety offered to make each case interesting and distinctive. It is ex-

actly what is promised in the title: a history and overview of mass hysterias in schools worldwide over the past four and a half centuries. This is the definitive book on the subject, and though the topic may seem narrow the authors do not shy away from the many other facets of interest to psychologists, sociologists, and skeptics, such as false accusations made during mass hysterias, false memories (such as those that fueled the infamous McMartin preschool Satanic abuse hysteria in the 1980s), conspiracy theories, fairy folklore, both historical and modern witch hunts, hoaxes, and much more.

The consequences of mass hysterias can be dire, not only in the amount of time and money spent investigating the cause of sociogenic illnesses by police and cash-strapped school districts (repeated laboratory sampling for trace amounts of suspected—yet ultimately nonexistent—toxins can be very expensive) but also to those involved. The authors point out that "Occasionally, teachers, principals, and even students have been forced to flee after accusations that they had caused the outbreak by practicing witchcraft or black magic. As always, the best way to combat episodes like this is to educate people about the history of the outbreaks" (p. 9).

With extensive chapter notes, a bibliography, and an index, there really is very little to complain about in this book. Bartholomew and Rickard have produced a fascinating, readable, and scholarly analysis of a widespread but little-recognized social problem that has important lessons for skeptics and the public alike. ■

Benjamin Radford is author, coauthor, or contributor to twenty books, including his latest, *Mysterious New Mexico: Miracles, Magic, and Monsters in the Land of Enchantment* (University of New Mexico Press, 2014).

Moonlight and Magic

JAY PASACHOFF

An English magician is traveling to the south of France in order to unmask a beautiful American clairvoyant who is in the process of entrapping a millionaire. The millionaire and his mother are in the process of endowing a foundation for the psychic and her mother—and not guaranteeing what money will spin off or where it will go. What better plot could inveigle readers of the Skeptical Inquirer to go to the movies?

***Magic in the Moonlight*. Written and directed by Woody Allen.** Perdido Productions/Sony Pictures Classics. 97 minutes. Released July 25, 2014.

This Woody Allen film is gorgeously filmed and edited. Even the sight of the collection of colorful roadsters (a red Alfa Romeo stars) and other convertibles in this 1920s-era movie is worth the admission. The jazz score was no doubt selected by Allen himself, a noted jazz aficionado and practitioner.

Colin Firth, in a repeat of his Mr. Darcy role, is our hero Stanley, the obnoxious rational man and skeptic who accepts a fellow magician's request to travel with him to the Côte d'Azur, where séances are underway. He has unmasked fraudulent psychics in the past. Yet Emma Stone's green eyes are enough to entrap him, just as her character, Sophie, entrapped the hapless millionaire. We meet the millionaire as he practices crooning to her while accompanying himself on a ukulele. Logic must rule, Stanley is sure, and it seems that our boorish, self-assured magician will convince all of the fraud.

In one surprising scene, when the Alfa Romeo carrying Stanley and Sophie breaks down on an incredibly scenic Corniche road, the two characters are drenched by a rainstorm and find an old astronomical observatory. They enter the unlocked building to shelter beneath a beautiful, long refracting telescope. But later, after the sky clears, the view of the stars and moon seen through the dome's opened slit is not real. I would rather they had gotten the constellations right, with as much attention paid to the astronomy as they gave to the period costumes and cars.

Movie scripts have their twists and turns, and it would be churlish of me to reveal them. Suffice it to say that I can guarantee that readers will have an interesting time at the movie and will be glad that they saw it. ■

Jay Pasachoff, Field Memorial Professor of Astronomy at Williams College and Chair of the American Astronomical Society's Historical Astronomy Division, is also a Visitor to the Planetary Sciences Department at Caltech. A CSI Fellow and SI contributing editor, he leads a seminar at Williams College on science and pseudoscience.

(Continued from p.31)

has all but been eliminated from farm fields across the Midwest. With Roundup-ready corn and soy, glyphosate use skyrocketed to 182 million pounds annually. Simultaneously, the monarch butterfly population has been plunging. Now, population at their Mexican wintering grounds was 33.5 million, a calamitous drop from one billion in 1997, the year after Roundup-ready crops were marketed.

I encourage readers to see the National Resources Defense Council petition to the EPA, not to ban Roundup, but to prevent Roundup and other weed-killer use along highways and power-line rights of way where milkweed, a relatively short plant, could grow freely without interfering with maintenance or emergency crews; to require farmers to establish herbicide-free safety zones in or around their fields, and creation of other milkweed-friendly habitat; to avoid dramatic increases in herbicide use with new herbicide-resistant crops, and to assess use of Roundup on gardens, landscaping, and other cosmetic purposes for their impacts on monarchs.

Mary Elizabeth Elliott, PhD
(Pharmacology)
Madison, Wisconsin

Claire Herrick, MD
Flagstaff, Arizona

I presume some of the genetic modifications to crops are to enhance resistance to insects and other parasites. Given the continual "arms race" between plants and their predators, evolution will surely produce parasites better equipped to consume these modified crops. Just as antibiotics generated super bugs that are now causing problems, won't super parasites also evolve?

GMOs may well be safe to eat but may yet in the long term be a cause for concern.

Wayne Hodgins
Cote St Luc, QC, Canada

I am one of those Luddites unconvinced GMO food is safe. This despite all the assurances and all the proofs that there is nothing to fear. Why do all the calm and soothing words not work for me? For one, there were calm and soothing words about thalidomide, tobacco, Love Canal, and fracking. For another, corporations support GMOs. Corporations routinely ignore public safety for private profit. Therefore, corporations are lying about GMOs being safe.

Yes, my logic is completely flawed. Yes, my conclusion is utterly unscientific. Yes, I don't care! *Get* that corporate GMO foodstuff *away* from me!

Tim Sayeau
Winnipeg, Manitoba,
Canada

Steven Novella Responds:

Many of the points brought up in the responses to my column on the health effects of GMOs are common misconceptions and anti-GMO talking points. I will address them by issue.

Pollen contamination: There is no way to completely prevent wind-pollinated crops from being exposed to pollen in the wind. However, such exposure can practically be limited to very low levels with field isolation, using natural barriers, and planting of barrier crops. Such methods can be very effective (http://blog.seedsavers.org/preventing-gmo-contamination-in-your-open-pollinated-corn/). Further, this argument amounts to circular reasoning: GMOs are bad because they can contaminate non-GMO crops, but if GMO crops are safe what's the harm with contamination? There is also no reason to suspect that cross-pollination from GMO crops presents more of a risk or problem than from hybrid crops.

Monsanto Lawsuits: Monsanto does not sue farmers for accidental contamination. This is simply a myth used as anti-GMO propaganda, with no basis in reality. In 2011 organic farmers sued Monsanto (http://www.osgata.org/osgata-et-al-v-monsanto/) in order to protect themselves from the possibility that Monsanto might sue them in the future for contamination, but they could not cite a single case in which this had already happened. Monsanto has only sued farmers for deliberate patent infringement, not accidental contamination.

Pesticide resistance: Any method used to control pests (insects, fungus, weeds) will create the potential for resistance to develop. It is true that overreliance on single methods are more prone to develop resistance more rapidly. Although this was not the topic of my article, I have written about this elsewhere, (http://theness.com/neurologicablog/index.php/the-gmo-controversy/) where I point out that this is not an issue of GMOs but of how specific GMOs are used as part of an overall pest-control strategy. Any use of pesticides (including organic pesticides) will lead to resistance. Tilling releases CO_2 from the soil. Manual weeding is labor intensive. There is no one perfect strategy. GMOs, if used intelligently, can be part of an integrated pest management system. Further, the term "superweeds" is misleading. They are only "super" in that they are resistant to one herbicide. One writer compared the situation to antibiotic resistance. This is actually a good analogy. We would not favor abandoning antibiotics entirely because their use promotes resistance in bacteria. We simply have to use antibiotics smartly to minimize resistance.

GMO Safety: R. Allen Gilliam, despite accusing me of a straw man fallacy, begins with one of his own, characterizing my position as, "since GMOs old enough to have been researched have not been shown to be unsafe, all newer and future GMOs will be safe." I never made any such suggestion. I specifically advocate for ongoing testing of GMOs, including new cultivars. GMOs are tested for toxicity, allergenicity, and equivalency to parent varieties. GMOs are tested more than any other food, despite the fact that there is no scientific reason to assume that they present more of a risk than hybridization or mutation farming.

Transgenic GMOs: Much of the fear of GMOs is from transgenic varieties, where a gene from a distant species is placed within a crop plant, such as the "fish tomato" example. I made the point that fish genes are not inherently risky, but further, fish and tomatoes share many of their genes because all life on Earth is closely related. The source of the gene or the protein does not really matter to the safety of the protein. Appropriate gene promoters are used, regardless of the source of the original gene. Using transgenic techniques is a good justification for carefully testing the resulting crop, but not for banning GMO technology in its entirety.

Monarch Butterflies: The relationship between GMOs and monarch butterflies is more complex than Mary Elliot and Claire Herrick suggest. The reasons for the decline in Monarch butterfly populations are not fully understood and are likely multifactorial. Decline in milkweed populations is likely an important factor. It is plausible, but unproven, that decline in milkweed populations is due to use of Roundup. Again—this is not an issue of GMOs but of large-scale farming. Farmers use various techniques to eliminate weeds from their crops. This is a good example, actually, of how focusing narrowly on GMOs can result in missing the bigger picture. The suggestion to have milkweed safety zones is a good one.

Conclusion: Again, I would implore readers not to demonize genetic modification as a technology based on unsubstantiated fears. Each GMO needs to be evaluated on its own merits. Golden rice, for example, has nothing to do with pesticides. Not all crops are wind pollenated. Not all GMOs are owned by corporations. Genetic modification is a powerful technology that needs to be monitored for safety, but if used intelligently can be a huge boon to our food production, reducing its environmental impact and improving human nutrition and food security.

Mars from Mars

Regardless of the wealth of intriguing information within your July/August 2014 issue, I am most awestruck by the fact that there is a printed photo of Mars [by the Mars rover *Curiosity*] on the back cover. Every time I glance at it, I am truly astounded, and reminded of the perseverance of human reason. Thank you for such a simple but profound pleasure.

Jamie Adams
St. John's, Newfoundland,
Canada

She's Not Exempt

Letter-writers (July/August) are blasting Bryan Farha for having the nerve, when Sylvia Browne was dead, to write critical words about her, to mention the lives she damaged with her dishonesty, her mendacity, her phony medical and social advice. It's a no-no to disparage the dead, it seems. (I was sixteen when Hitler died, and I said to my sister that history's worst person is now dead. I deeply regret this.)

However: Sylvia Browne was heavy into the paranormal, always conferring with and quoting various spirits. One must conclude that she is watching us right now as an active spirit. And as a spirit she is not really dead, no longer exempt from criticism.

So, Bryan Farha, let her have it! And I'm right with you.

Chic Schissel
Roslyn Heights, New York

It was a pleasure to read Bryan Farha's well-organized response to the comments of Frits and Meg regarding the "Death of a Psychic" in the March/April issue. I would agree with both Frits and Meg if it were an obituary. The Latin *de mortuis nihil nisi bene* is culturally proper as well as reassuring for readers of obituaries. However, not only was the SI item *not* an obituary, but it was also under "News and Comment" with subtitle "The Real Sylvia Browne." Bryan Farha did a quintessentially excellent analogy by referencing CNN's article on "Michael Jackson dead at 50 after cardiac arrest" along with the URL including lists of charges and counts of lewd conduct. Public records remain public. Sylvia Browne's records are public. None of her predictions in regard to police investigations of missing persons ever were correct. In fact, Browne had a knack for predicting people dead who were later found alive and vice versa. She pronounced the West Virginia coal miner tragedy as having all miners survive; all were confirmed dead. How anyone could be so wrong for so long and make so much money doing so seems to occur "only in America," to quote Yakov Smirnoff.

Leonard J. Mather, PhD
Marietta, Georgia

I'd like to offer my support for Bryan Farha's "News and Comment" article on Sylvia Browne.

Perhaps certain readers forgot which magazine they were reading. It's your job to review the relevant—yes, relevant— facts. Why else would you be reporting Sylvia Browne's death? If you reported the death of a famous baseball player, you would do so not because he cheated on his wife, gambled, or used steroids, but only if he had a psychic business on the side or was notorious for some connection to a UFO sighting.

I don't understand the "polite company" attitude. SI is about getting down to the nitty gritty, and Sylvia Browne was a crook; she deceived, robbed, and harmed people. Your piece was appropriate. Please continue with your exemplary and informative journalism.

Joseph DeRosa
Sparks, Nevada

There's much more Skeptical Inquirer available on our website!

Here's just a sample of what you'll find:

Faking Science Cred at a Sci-Fi Con: Not Smart
Sharon Hill's "Sounds Sciencey" column discusses her visit to a sci-fi fantasy convention and the scientific pretensions of paranormal investigators there.

Jews and Reptilians
Conspiracy debunker and Burzynski gadfly Robert Blaskiewicz examines David Icke's curious theories about the "real" origin of Eastern European Ashkenazi Jews.

For more online columns, features, and special content, visit **www.csicop.org.**

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words**. Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

SKEPTICAL ANNIVERSARIES

by Tim Farley

November 1939: Earliest documented use of the "Don't keep your minds so open that your brains fall out" dictum by diplomat Walter Kotschnig at an Armistice Day address at Smith College.

November 9, 1934: Carl Sagan was born. Carl Sagan Day events are now held in many places around the country.

November 10, 1904: A mandatory vaccination law in Brazil lead to widespread rioting in Rio de Janeiro, called the "Vaccine Revolt."

November 19, 2009: So-called "Climategate" began with the revelation of emails stolen from climate scientists by hackers. Several later investigations cleared the scientists of any wrongdoing.

November 24, 1974: A 3.2 million-year-old skeleton of *Australopithecus afarensis*, nicknamed Lucy, was discovered. It is key to our understanding of human evolution.

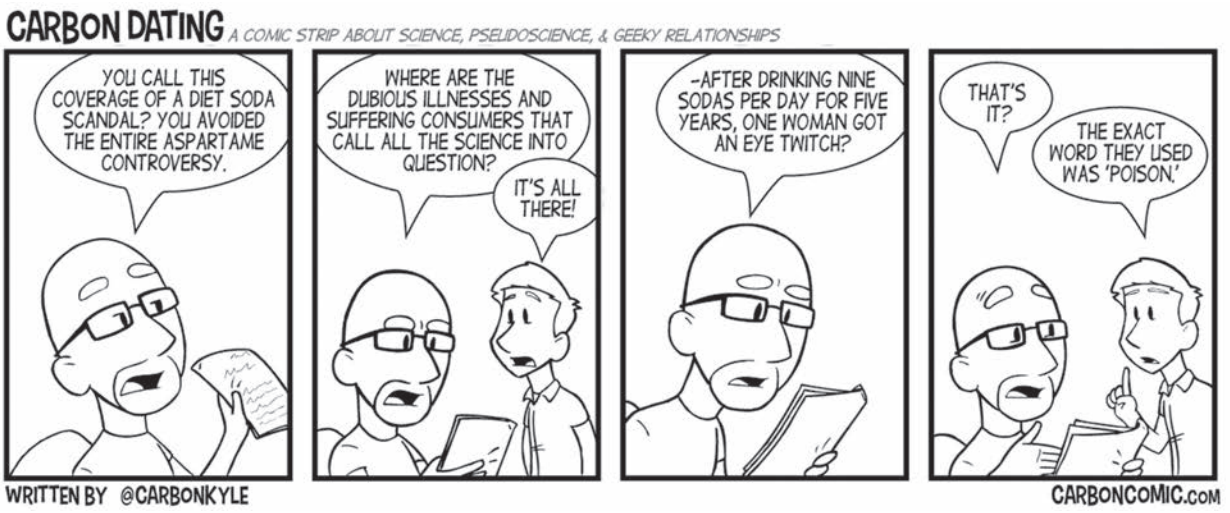
December 9, 1979: The World Health Organization certified that smallpox had been completely eradicated via vaccine.

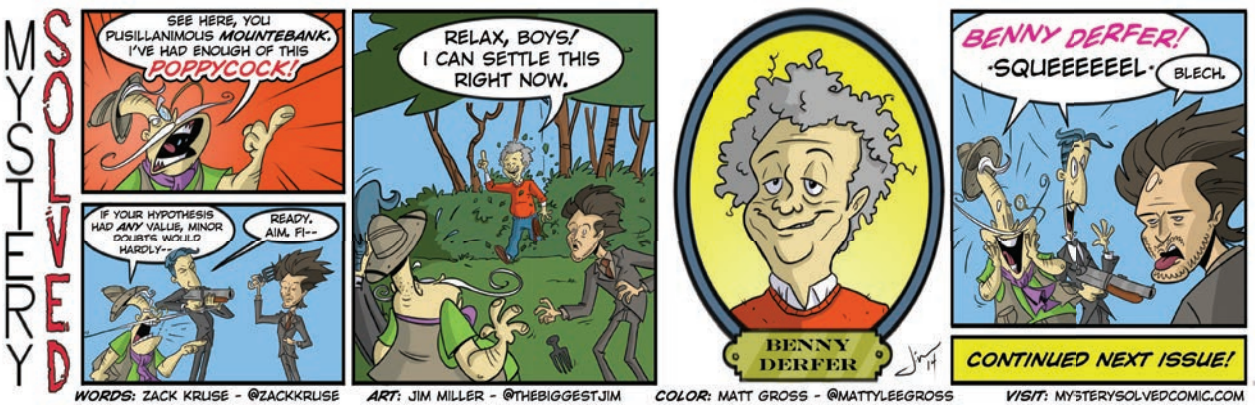
December 11, 1914: A New York City magistrate declared astrology scientific and exonerated Evangeline Adams, a local astrologer charged with fraud.

December 17, 1969: The U.S. Air Force's investigation of UFOs, "Project Blue Book," was terminated.

December 21, 1954: Leon Festinger's infiltration of a Chicago-area apocalyptic cult (which expected the end of the world this day) led him to the theory of cognitive dissonance.

Tim Farley is the creator of the website whatstheharm.net and blogs at skeptools.com.
He is a past fellow of the James Randi Educational Foundation.


CARBON DATING
A COMIC STRIP ABOUT SCIENCE, PSELIDOSCIENCE, & GEEKY RELATIONSHIPS
YOU CALL THIS COVERAGE OF A DIET SODA SCANDAL? YOU AVOIDED THE ENTIRE ASPARTAME CONTROVERSY.
WHERE ARE THE DUBIOUS ILLNESSES AND SUFFERING CONSUMERS THAT CALL ALL THE SCIENCE INTO QUESTION?
IT'S ALL THERE!
-AFTER DRINKING NINE SODAS PER DAY FOR FIVE YEARS, ONE WOMAN GOT AN EYE TWITCH?
THAT'S IT?
THE EXACT WORD THEY USED WAS 'POISON.'
WRITTEN BY @CARBONKYLE
CARBONCOMIC.COM


MYSTERY SOLVED
SEE HERE, YOU PUSILLANIMOUS MOUNTEBANK. I'VE HAD ENOUGH OF THIS POPPYCOCK!
IF YOUR HYPOTHESIS HAD ANY VALUE, MINOR DOUBTS WOULD HARDLY--
READY. AIM. FI--
RELAX, BOYS! I CAN SETTLE THIS RIGHT NOW.
BENNY DERFER
BENNY DERFER!
-SQUEEEEEEL-
BLECH.
CONTINUED NEXT ISSUE!
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